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The ALVORD & DAVIS DRILL AND PROBLEM BOOK IN ARITHMETIC

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THE

ALVORD AND DAVIS

Drill and Problem Book

in Arithmetic

FOR FIFTH TO EIGHTH GRADES

BY

CHARLES P. ALVORD
Supervisor of Grammar Grades
Buffalo, N. Y.

AND

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H. E. REED, Publisher
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PREFACE

An efficient course of instruction in arithmetic has a threefold purpose. First, it must teach the fundamental number combinations so thoroughly that pupils can state them automatically. Secondly, it must teach the abstract processes in arithmetic so well that pupils can perform them with absolute accuracy and practical rapidity. Thirdly, it must develop in pupils the power to reason and to apply their knowledge of number to practical concrete problems.

Skill in the facts and processes can be developed only by ceaseless, systematic drills, conducted to correspond to the practical manner in which they are used in every-day computation.

The further purpose—to solve problems—can be acquired only by a large amount of practice in actually solving problems.

This book has been prepared for the purpose of supplying a great number of abstract examples to be used in drill and an abundance of problems applying the facts and processes. These have been carefully graded. In the sets of miscellaneous problems a wide range of concrete conditions, all of which are within the comprehension of pupils, has been used. There is a sufficient variety in the expression of problems involving similar conditions so that, in most cases, pupils must reason each problem independently of others. Arithmetical puzzles have been avoided.

The work is arranged topically and the topics usually given in modern courses of study have been fully covered.

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CONTENTS

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THE ALVORD AND DAVIS DRILL AND PROBLEM BOOK

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ROMAN NOTATION AND NUMERATION

1. Write in Roman numerals 1, 2, 3, 4, 5, 6, 7, 8 and 9.

2. Express the following numbers in Roman notation: 11, 12, 13, 14, 15, 16, 17, 18, 19.

3. Using Roman numerals, express 10, 20, 30, 40, 50, 60, 70, 80 and 90.

4. Express in Roman notation: 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 2000 and 10,000.

5. Write in Arabic notation: L, I, M, V, D, X, $\overline{\text{VIII}}$, C.

6. In the Roman notation show the effect of (*a*) repeating a letter; (*b*) placing a letter before another of greater value; (*c*) placing a letter after another of greater value; (*d*) placing a bar over a letter.

7. Write in Roman notation:

a. 28	*e*. 105	*i*. 506	*m*. 1912
b. 42	*f*. 189	*j*. 973	*n*. 2356
c. 56	*g*. 246	*k*. 1492	*o*. 5864
d. 97	*h*. 402	*l*. 1607	*p*. 10852

8. Express the following numbers of book chapters in Arabic notation.

a. XIV.	*d*. CXLIX.	*g*. CXXXVII.
b. XXVI.	*e*. CLXV.	*h*. XCIX.
c. LXXXIX.	*f*. CXCII.	*i*. XCXVIII.

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9. The numbers of the following years were on corner-stones of buildings. Write them in Arabic notation.

a. MDCCXC.

b. MCMXI.

c. MDCCCLIX.

10. In what other ways may IV and MCMXI be expressed by Roman numerals?

ADDITION

Count to 50 by 2's beginning with 0; with 1.

Count to 50 by 3's beginning with 0; with 1, 2.

Count to 50 by 4's beginning with 0; with 1, 2, 3.

Count to 100 by 5's beginning with 0; with 1, 2, 3, 4.

Count to 100 by 6's beginning with 0; with 1, 2, 3, 4, 5.

Count to 100 by 7's beginning with 0; with 1, 2, 3, 4, 5, 6.

Count to 100 by 8's beginning with 0; with 1, 2, 3, 4, 5, 6, 7.

Count to 100 by 9's beginning with 0; with 1, 2, 3, 4, 5, 6, 7, 8.

Count to 100 by 10's beginning with 0; with 1, 2, 3, 4, 5, 6, 7, 8, 9.

Count to 1000 by 100's.

Reverse each of the above, counting backward.

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Add orally:

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*
1.	2	5	9	3	1	9	8	2
	1	5	6	3	1	8	3	6
2.	7	9	3	7	4	6	5	2
	6	3	1	9	4	5	9	4
3.	3	7	9	7	6	6	2	7
	4	1	9	3	6	4	2	5
4.	7	4	2	7	3	8	1	7
	7	5	8	4	2	5	4	0
5.	8	1	9	2	1	7	3	0
	6	5	4	9	8	2	5	4
6.	6	8	9	8	1	2	8	9
	3	7	1	8	6	5	4	0

Use this page for accuracy and speed. Time individual pupils, rows of pupils, and the whole class from time to time throughout the several years the book is used. This work is fundamental and needs constant drill.

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What number added to the subtrahend equals the minuend?

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*
7.	13	3	14	5	11	8	17	10
	8	2	7	1	4	6	8	5
8.	14	11	4	13	8	11	6	14
	6	5	1	7	3	2	1	9
9.	12	16	9	10	18	7	10	12
	4	8	3	6	9	2	9	7
10.	15	6	10	2	5	9	11	9
	6	3	2	1	3	4	3	9
11.	16	9	13	6	8	12	9	5
	7	2	4	2	4	3	8	5
12.	8	7	15	12	4	10	7	7
	1	6	7	6	2	3	3	7

Use this page for accuracy and speed. Time individual pupils, rows of pupils, and the whole class from time to time throughout the several years the book is used. This work is fundamental and needs constant drill.

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1. Add 5 to each number in column *a*.
   Add 6 to each number in column *a*.
   Add 7 to each number in column *a*.
   Add 8 to each number in column *a*.
   Add 9 to each number in column *a*.
2. Add 4 to each number in column *b*.
   Do the same with 5; 6; 7; 8; 9.
3. Add 3 to each number in column *c*.
   Do the same with 4; 5; 6; 7; 8; 9.
4. Add 2 to each number in column *d*.
   Do the same with 3; 4; 5; 6; 7; 8; 9.
5. Add 1 to each number in column *e*.
   Do the same with 2; 3; 4; 5; 6; 7; 8; 9.

a	*b*	*c*	*d*	*e*
5	6	7	8	9
25	16	47	38	59
75	46	57	68	29
15	86	17	98	49
35	26	87	48	89
95	56	67	78	19
45	96	27	18	79
55	76	97	88	69
85	36	37	28	99
65	66	77	58	39

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1. Add each column.
2. Add each row.
3. Add the sums of the columns.
4. Add the sums of the rows.

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*
1.	11	54	47	97	73	87	37	68	67	16
2.	23	62	72	27	77	93	46	85	96	47
3.	33	12	66	29	34	86	45	95	17	78
4.	32	49	24	61	84	26	21	74	94	25
5.	48	63	13	60	53	59	83	18	51	79
6.	64	43	65	88	36	71	44	91	40	58
7.	69	35	98	14	80	22	19	75	57	50
8.	55	42	76	39	41	30	52	92	38	82
9.	28	99	56	70	15	81	20	31	90	89

Use this page for accuracy and speed. Time individual pupils, rows of pupils and the whole class.

The teacher may continue the drill by having different numbers added orally, or on paper, to each of the numbers in the square; e.g., add each number under *b* to 11.

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5. Add orally each of the lettered numbers in the second column of I to every number in the first column.

6. Do the same with the columns of II.

I			II	
1. 31	*a.* 10		1. 90	*a.* 19
2. 10	*b.* 40		2. 84	*b.* 28
3. 57	*c.* 30		3. 72	*c.* 37
4. 23	*d.* 80		4. 65	*d.* 46
5. 98	*e.* 50		5. 51	*e.* 55
6. 64	*f.* 20		6. 49	*f.* 64
7. 76	*g.* 70		7. 37	*g.* 73
8. 19	*h.* 60		8. 28	*h.* 82
9. 82	*i.* 90		9. 16	*i.* 91
10. 45	*j.* 100		10. 103	*j.* 100

1.	2.	3.	4.	5.
183,630	20,064	18,550	945,805	50,923
274,235	45,596	607	742,482	600,212
364,840	6,428	821,349	9,469	75,561
5,445	76,510	24,281	6,406	80,736
546,050	81,812	923	3,273	900,128
6,665	75,832	3,723	329	15,897
721,210	23,900	6,046	48,242	30,478
781,815	6,421	9,469	824,349	159
842,420	7,890	712,182	607	40,646
93,025	15,532	915,805	48,550	57,380

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6.	7.	8.	9.	10.
2,847	1,076	749	2,084	3,401
3,015	2,468	38	5,162	2,869
2,749	307	4,526	1,374	7,352
1,068	2,867	2,078	67	6,947
432	7,945	6,905	298	835
5,139	4,158	369	4,876	99

11.	12.	13.	14.	15.
784	1,237	367	27,068	30,768
1,683	806	2,018	4,976	21,465
2,907	5,964	4,998	345	7,829
3,587	466	2,657	35,196	44,396
6,942	3,291	2,775	48,287	25,978
759	2,489	3,987	5,076	7,654

16.	17.	18.	19.	20.
23,718	11,111	12,345	39,087	42,718
19,605	22,222	23,456	6,498	16,987
4,739	33,333	34,567	856	39,042
481	44,444	45,678	52,701	65,839
56,297	55,555	56,789	9,679	28,875
7,463	66,666	67,891	48,563	67,564
92,554	77,777	23,456	10,987	10,988
876	88,888	34,567	76,648	72,196
5,902	99,999	45,678	5,770	58,671
79,389	34,521	56,789	29,486	25,349

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	21.	22.	23.	24.	25.
1.	218,407	1,076,425	240,167	372,416	2,073,694
2.	2,753,381	70,317	7,944	1,095,832	607,611
3.	74,223	213,084	1,532,381	42,173	732,679
4.	391,532	92,730	9,305	8,671	728,439
5.	20,979	5,958	296,713	678,078	280,102
6.	1,438,165	3,968,663	3,298	8,948	5,985,988
7.	56,016	27,441	5,830	4,324	981,943
8.	8,277,458	4,279	3,768,022	86,396	417,927
9.	69,840	2,284,596	4,676	9,595	7,046,361
10.	42,794	6,505	2,149	3,229,277	196,794
11.	782,393	49,865	500,955	9,802	326,096
12.	97,697	1,628	967	53,799	3,852,138
13.	1,625,136	753,852	7,497	7,013	890,527
14.	6,875	18,639	1,809,588	1,410	265,217
15.	918,919	2,384	4,711	172,647	617,858

Additional practice may be given by having all the pupils follow these directions:

Copy and add the numbers in rows 1, 2 and 3.
Copy and add the numbers in rows 4, 5 and 6.
Copy and add the numbers in rows 7, 8 and 9.
Copy and add the numbers in rows 10, 11 and 12.
Copy and add the numbers in rows 13, 14 and 15.

To the pupil: To gain in speed add each example three times, time yourself and try to increase your speed each time. To check your answer after adding an example add it again in the opposite direction.

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Add the following. Each example should be completed within two minutes.

	26.	27.	28.	29.	30.	31.
1.	13579	29620	37960	67759	85763	57396
2.	98653	91717	72647	42676	17167	72764
3.	24687	13189	26478	76887	28942	87246
4.	53175	38248	61795	91945	75676	41769
5.	62408	85901	18954	58358	94491	51898
6.	57139	54393	85812	15290	32788	95885
7.	12907	46832	59583	89134	53055	35195
8.	43659	67355	94169	64569	69919	96416
9.	90781	74564	43670	73477	70864	67437
10.	24680	47640	32725	22622	85273	27932
11.	97531	76768	27232	37258	22622	57283
12.	18395	65477	76347	46807	77437	70643
13.	95307	53751	61496	91996	96546	91649
14.	67895	38634	15953	55035	43198	35895
15.	56931	83489	58589	88723	19251	28518
16.	83496	39596	89815	19449	85385	49517
17.	41674	92805	97164	67657	54919	59716
18.	75752	21313	74628	24982	78867	48762
19.	32535	17178	46277	76171	67624	27467
20.	19328	76927	69735	39798	37521	90673

32, 33, 34, 35, 36, 37. Add the first 10 numbers in each of the above.

38, 39, 40, 41, 42, 43. Add the last 10 numbers in each of the above.

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SUBTRACTION

1. Subtract, orally, each of the lettered numbers in the second column of I from every number in the first column.

2. Do the same with the columns of II.

I.		II.	
1. 19	*a.* 1	1. 20	*a.* 13
2. 42	*b.* 2	2. 31	*b.* 17
3. 75	*c.* 3	3. 42	*c.* 11
4. 108	*d.* 4	4. 53	*d.* 20
5. 20	*e.* 5	5. 64	*e.* 16
6. 86	*f.* 6	6. 75	*f.* 14
7. 64	*g.* 7	7. 86	*g.* 18
8. 31	*h.* 8	8. 97	*h.* 15
9. 97	*i.* 9	9. 108	*i.* 19
10. 53	*j.* 10	10. 119	*j.* 12

3. Subtract each of the lettered numbers in the second column of III from every number in the first column.

4. Do the same with the columns of IV.

III.		IV.	
1. 13,427	*a.* 7,649	1. 21,031	*a.* 3,799
2. 25,011	*b.* 5,988	2. 14,521	*b.* 4,865
3. 42,134	*c.* 3,697	3. 10,312	*c.* 7,598
4. 51,254	*d.* 4,758	4. 31,246	*d.* 9,807
5. 32,001	*e.* 6,689	5. 23,002	*e.* 4,136
6. 63,410	*f.* 5,374	6. 17,350	*f.* 2,786
7. 10,221	*g.* 2,798	7. 41,122	*g.* 1,999
8. 21,860	*h.* 6,057	8. 32,049	*h.* 3,874
9. 52,019	*i.* 3,992	9. 17,520	*i.* 2,658
10. 23,130	*j.* 1,867	10. 50,481	*j.* 7,269

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Subtract and prove by addition.

1.	28,013 — 19,174.	23.	43,013 — 26,957.
2.	54,967 — 9,889.	24.	77,144 — 69,085.
3.	93,057 — 8,298.	25.	44,021 — 37,036.
4.	24,986 — 9,989.	26.	300,024 — 291,095.
5.	72,031 — 8,331.	27.	411,103 — 36,798.
6.	98,756 — 88,988.	28.	234,343 — 129,273.
7.	66,174 — 39,499.	29.	155,444 — 74,987.
8.	32,051 — 7,478.	30.	501,010 — 490,403.
9.	13,782 — 9,893.	31.	600,006 — 98,992.
10.	80,954 — 71,968.	32.	174,222 — 93,716.
11.	42,173 — 6,385.	33.	212,121 — 138,787.
12.	50,062 — 12,592.	34.	800,000 — 319,892.
13.	63,114 — 59,267.	35.	543,210 — 299,998.
14.	59,356 — 39,657.	36.	643,011 — 88,888.
15.	30,024 — 13,656.	37.	101,100 — 39,807.
16.	13,560 — 8,969.	38.	265,323 — 177,777.
17.	27,381 — 7,787.	39.	633,332 — 228,974.
18.	42,105 — 15,036.	40.	355,554 — 296,578.
19.	35,220 — 28,908.	41.	109,190 — 78,899.
20.	14,973 — 8,976.	42.	119,101 — 39,781.
21.	63,007 — 47,879.	43.	700,001 — 621,399.
22.	82,195 — 74,097.	44.	123,123 — 94,444.

45. 1,234,123 — 777,334.
46. 43,214,321 — 2,666,665.
47. 32,103,210 — 31,933,334.
48. 12,340,123 — 8,889,999.
49. 54,021,000 — 29,899,911.
50. 30,102,030 — 10,999,082.

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MULTIPLICATION.

Multiply:

1.

a	*b*	*c*	*d*	*e*	*f*	*g*	*h*
5	4	9	1	10	7	2	12
2	10	11	1	10	5	10	5

2.

8	10	8	6	7	5	1	12
8	3	7	10	1	3	11	12

3.

6	10	11	2	8	6	9	6
3	12	3	1	10	4	7	6

4.

8	2	1	5	11	6	6	0
1	11	12	8	4	2	11	9

5.

9	10	12	8	7	7	4	3
1	11	2	11	3	7	12	1

Use this page for accuracy and speed. Time individual pupils, rows of pupils, and the whole class from time to time throughout the several years the book is used. This work is fundamental and needs constant drill.

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Multiply:

6.

a	*b*	*c*	*d*	*e*	*f*	*g*	*h*
10	2	7	12	7	9	2	12
7	2	4	3	6	5	7	11

7.

8	3	9	8	10	3	12	5
6	2	12	4	1	3	6	5

8.

8	9	4	10	2	4	7	7
3	9	1	5	8	4	11	0

9.

4	6	9	8	5	4	12	9
3	9	2	12	1	9	7	8

10.

2	6	10	9	5	6	5	11
4	5	9	3	11	1	4	11

Use this page for accuracy and speed. Time individual pupils, rows of pupils, and the whole class from time to time throughout the several years the book is used. This work is fundamental and needs constant drill.

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Multiply and prove by division:

1. 2×89.
2. 4×75.
3. 6×29.
4. 3×76.
5. 7×39.
6. 5×96.
7. 4×28.
8. 8×70.
9. 7×28.
10. 9×91.
11. 5×78.
12. 8×19.
13. 6×83.
14. 7×47.
15. 8×27.
16. 9×28.
17. 7×65.
18. 9×74.
19. 8×83.
20. 7×84.
21. 8×56.
22. 9×36.
23. 6×76.
24. 7×98.
25. 9×57.
26. 12×19.
27. 17×73.
28. 19×24.
29. 15×49.
30. 18×90.
31. 16×47.
32. 14×39.
33. 13×95.
34. 25×38.
35. 20×98.
36. 29×65.
37. 27×79.
38. 28×54.
39. 26×67.
40. 31×47.
41. 38×79.
42. 36×69.
43. 37×68.
44. 40×76.
45. 49×38.
46. 45×86.

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47. 58×67.
48. 56×88.
49. 59×75.
50. 57×54.
51. 69×67.
52. 67×49.
53. 68×53.
54. 70×98.
55. 78×64.
56. 77×62.
57. 86×89.
58. 87×87.
59. 88×99.
60. 96×80.
61. 97×98.
62. 98×95.
63. 100×100.
64. 107×109.
65. 238×479.
66. 259×386.
67. 376×570.
68. 405×698.
69. 468×775.
70. 579×867.
71. 690×799.
72. 786×497.
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77. $2{,}196 \times 4{,}096$.
78. $4{,}587 \times 6{,}879$.
79. $6{,}098 \times 7{,}978$.
80. $7{,}986 \times 8{,}899$.
81. $3{,}897 \times 17{,}068$.
82. $2{,}645 \times 35{,}879$.
83. $7{,}839 \times 58{,}937$.
84. $4{,}256 \times 70{,}186$.
85. $6{,}739 \times 130{,}597$.
86. $2{,}008 \times 486{,}005$.
87. $8{,}729 \times 275.389$.
88. $3{,}007 \times 107{,}638$.
89. $4{,}000 \times 100{,}407$.
90. $5{,}290 \times 270{,}069$.
91. $6{,}677 \times 300{,}078$.
92. $7{,}598 \times 419{,}984$.
93. $8{,}989 \times 384{,}756$.
94. $8{,}657 \times 476{,}689$.
95. $6{,}796 \times 527{,}886$.
96. $6{,}889 \times 549{,}109$.
97. $7{,}694 \times 557{,}698$.
98. $8{,}009 \times 678{,}768$.
99. $8{,}888 \times 697{,}789$.
100. $9{,}999 \times 979{,}868$.

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Examples for drill in multiplication.

1. Multiply each of the numbers in the first column of I by each of the numbers in the second column, thus: $17 \times 2{,}357$; $23 \times 2{,}357$; etc. through *j*.

2. Do the same with the columns of II.

I.		II.	
1. 2,357	*a.* 17	1. 3,509	*a.* 217
2. 4,068	*b.* 23	2. 2,784	*b.* 309
3. 5,694	*c.* 38	3. 1,365	*c.* 476
4. 1,736	*d.* 47	4. 2,748	*d.* 584
5. 2,597	*e.* 56	5. 3,097	*e.* 279
6. 3,048	*f.* 69	6. 2,876	*f.* 857
7. 6,719	*g.* 75	7. 3,908	*g.* 395
8. 1,887	*h.* 89	8. 2,747	*h.* 468
9. 2,584	*i.* 98	9. 5,689	*i.* 679
10. 3,167	*j.* 100	10. 3,975	*j.* 897

To the Teacher: If further drill in multiplication seems to you to be necessary the above arrangement of numbers will furnish two hundred additional examples by using the following directions:

a. Multiply each of the numbers in the first column of I by each of the numbers in the second column of II, thus: 217×2357; 309×2357, etc. through *j*.

b. In the same manner multiply each of the numbers in the first column of II by each of the numbers in the second column of I.

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DIVISION

Divide orally:

1.	$64 \div 8$.	$30 \div 3$.	$56 \div 7$.	$60 \div 6$.
2.	$7 \div 1$.	$15 \div 3$.	$11 \div 11$.	$144 \div 12$.
3.	$8 \div 1$.	$22 \div 11$.	$12 \div 1$.	$40 \div 5$.
4.	$44 \div 4$.	$12 \div 2$.	$66 \div 6$.	$0 \div 9$.
5.	$70 \div 7$.	$4 \div 2$.	$28 \div 4$.	$36 \div 3$.
6.	$42 \div 6$.	$45 \div 5$.	$14 \div 7$.	$132 \div 12$.
7.	$24 \div 3$.	$81 \div 9$.	$4 \div 1$.	$50 \div 5$.
8.	$16 \div 2$.	$16 \div 4$.	$0 \div 7$.	$77 \div 11$.
9.	$8 \div 2$.	$30 \div 5$.	$90 \div 9$.	$27 \div 3$.
10.	$55 \div 5$.	$6 \div 1$.	$20 \div 4$.	$121 \div 11$.
11.	$60 \div 5$.	$20 \div 2$.	$35 \div 7$.	$100 \div 10$.
12.	$1 \div 1$.	$99 \div 11$.	$40 \div 10$.	$10 \div 2$.
13.	$36 \div 6$.	$63 \div 7$.	$24 \div 4$.	$80 \div 8$.
14.	$2 \div 1$.	$33 \div 3$.	$120 \div 12$.	$18 \div 3$.
15.	$3 \div 1$.	$48 \div 4$.	$49 \div 7$.	$21 \div 3$.
16.	$88 \div 8$.	$24 \div 2$.	$110 \div 11$.	$9 \div 9$.
17.	$25 \div 5$.	$72 \div 6$.	$9 \div 3$.	$10 \div 1$.
18.	$8 \div 4$.	$108 \div 12$.	$6 \div 2$.	$48 \div 6$.
19.	$72 \div 8$.	$84 \div 7$.	$36 \div 4$.	$5 \div 5$.
20.	$96 \div 12$.	$18 \div 2$.	$54 \div 6$.	$12 \div 3$.

Use this page for accuracy and speed. Time individual pupils, rows of pupils, and the whole class from time to time throughout the several years the book is used. This work is fundamental and needs constant drill.

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Divide examples 1 to 25 orally.

1. 108 ÷ 9.
2. 112 ÷ 7.
3. 144 ÷ 8.
4. 192 ÷ 4.
5. 147 ÷ 3.
6. 175 ÷ 5.
7. 200 ÷ 8.
8. 252 ÷ 7.
9. 207 ÷ 9.
10. 276 ÷ 6.
11. 336 ÷ 8.
12. 308 ÷ 7.
13. 392 ÷ 4.
14. 306 ÷ 9.
15. 318 ÷ 6.
16. 364 ÷ 7.
17. 325 ÷ 5.
18. 413 ÷ 7.
19. 549 ÷ 9.
20. 1,444 ÷ 8.
21. 7,326 ÷ 5.
22. 3,018 ÷ 7.
23. 4,615 ÷ 9.
24. 5,003 ÷ 6.
25. 7,010 ÷ 8.
26. 1,360 ÷ 16.
27. 1,066 ÷ 13.
28. 1,330 ÷ 14.
29. 1,748 ÷ 19.
30. 1,632 ÷ 17.
31. 3,468 ÷ 18.
32. 2,017 ÷ 19.
33. 2,862 ÷ 27.
34. 2,625 ÷ 25.
35. 3,103 ÷ 29.
36. 7,406 ÷ 28.
37. 11,997 ÷ 36.
38. 14,852 ÷ 47.

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39. 30,182 ÷ 49.
40. 27,216 ÷ 56.
41. 43,721 ÷ 58.
42. 36,084 ÷ 62.
43. 45,761 ÷ 67.
44. 47,212 ÷ 74.
45. 61,074 ÷ 78.
46. 63,520 ÷ 80.
47. 72,874 ÷ 83.
48. 79,692 ÷ 87.
49. 109,604 ÷ 94.
50. 130,002 ÷ 98.
51. 469,096 ÷ 191.
52. 1,631,696 ÷ 254.
53. 9,816,673 ÷ 383.
54. 23,340,064 ÷ 488.
55. 47,109,580 ÷ 490.
56. 56,882,034 ÷ 594.
57. 57,300,012 ÷ 587.
58. 31,546,607 ÷ 1,961.
59. 489,877,092 ÷ 3,721.
60. 2,143,200 ÷ 570.
61. 362,700 ÷ 468.
62. 501,993 ÷ 579.
63. 896,103 ÷ 897.
64. 3,710,386 ÷ 1,037.
65. 8,994,816 ÷ 2,196.
66. 4,037,973 ÷ 4,587.
67. 48,649,844 ÷ 6,098.
68. 66,513,996 ÷ 3,897.
69. 71,067,414 ÷ 7,986.
70. 94,899,955 ÷ 2,645.
71. 462,007,143 ÷ 7,839.
72. 298,711,616 ÷ 4,256.
73. 323,667,466 ÷ 3,007.
74. 880,093,183 ÷ 6,739.
75. 975,898,040 ÷ 2,008.
76. 493,612,254 ÷ 3,006.

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Examples for drill in division.

1. Divide each of the numbers in the first column of I by each of the numbers in the second column, thus: 69,120 ÷ 18; 69,120 ÷ 36; etc., through *j*.

2. Do the same with the columns of II.

I.		II.	
1. 69,120	*a.* 18	1. 207,360	*a.* 108
2. 51,840	*b.* 36	2. 414,720	*b.* 162
3. 20,736	*c.* 48	3. 311,040	*c.* 648
4. 15,552	*d.* 96	4. 176,256	*d.* 324
5. 29,376	*e.* 54	5. 518,400	*e.* 576
6. 25,920	*f.* 27	6. 622,080	*f.* 1,728
7. 27,648	*g.* 144	7. 725,760	*g.* 1,296
8. 13,824	*h.* 432	8. 933,120	*h.* 1,152
9. 120,960	*i.* 288	9. 829,440	*i.* 3,456
10. 864,000	*j.* 192	10. 248,832	*j.* 2,592

To the Teacher: If further drill in division seems to you to be necessary the above arrangement of numbers will furnish two hundred additional examples by using the following directions:

a. Divide each of the numbers in the first column of I by each of the numbers in the second column of II, thus: 69,120 ÷ 108; 69,120 ÷ 162, etc., through *j*.

b. In the same manner divide each of the numbers in the first column of II by each of the numbers in the second column of I.

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Problems in the Fundamental Processes

1. A man willed his estate worth $20,000 to his wife and five children. If the children received $3,750, $3,250, $2,500, $2,000, and $1,750 respectively, what was the wife's share?

2. A certain railroad carried the following numbers of passengers during the months of 1911: 137,426; 95,076; 82,955; 98,413; 104,637; 146,198; 150,358; 161,456; 170,391; 98,215; 93,047; and 123,263. The same railroad carried 85,276 more passengers in 1910, and 78,019 fewer passengers in 1912. What was the total number of passengers carried during the three years?

3. Four boats left Duluth for Buffalo. The first carried 28,315 bu. of wheat; the second 29,468 bu.; the third, 4,796 bu. more than the first; and the fourth, 759 bu. less than the second. What was the total quantity of wheat carried by the four boats?

4. I purchased 9 yards of cloth at $1.75 a yard, 14 yards of silk at $ .85 a yard, 18 yards of lace at $ .16 a yard, and 8 yards of trimming at $ .45 a yard. I gave the clerk two twenty-dollar bills in payment. How much change should I have received?

5. A grain dealer purchased 746 bu. of rye at $ .85 per bu., 692 bu. of barley at $ .54 per bu., 1,750 bu. of corn at $ .48 per bu., 875 bu. of oats at $ .54 per bu., and 1,600 bu. of wheat at $ .92 per bu. What was the total amount of grain purchased?

How much was paid for it?

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6. A man owned five pieces of property which were assessed for the following amounts: the first, $35,250; the second, $27,600; the third, $4,550; the fourth, $4,275; and the fifth $2,800. The total assessed value was $37,236.50 less than the cost of the property. What did the man pay for the property?

7. The attendance at four city schools during 1912 was 1,236 pupils, 1,824 pupils, 1,406 pupils and 1,082 pupils respectively. This attendance showed increases over that of 1911 of 357 pupils, 379 pupils, 278 pupils and 195 pupils respectively. Find the total attendance for each year. If the average cost of tuition per pupil for one year was $32.82, what did it cost the city to educate the pupils both years?

8. A farm of 756 acres produced 24,192 bushels of wheat which sold for $.98 a bushel. What was the average amount received for each acre's yield of wheat?

9. A farm of 367 acres yielded 35,966 bushels of potatoes. What was the average yield per acre?

10. A crop of corn sold for $8844, the price per bushel being $.48. Since an average crop of 67 bushels was raised on each acre, what was the size of the farm?

11. A railroad company built double tracks between two cities 368 miles apart. Since there are 5280 feet in one mile, how many feet of rail were used?

12. A railroad company built 295 miles of track and used 440 rails per mile. Find the total weight of the track, allowing 384 lb. for the weight of each rail.

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13. A drover purchased 295 cows at $45 apiece. He sold them for $14,750. What did he gain on each cow?

14. A steamship moving at the rate of 196 miles a day, completed a trip in 15 days. If it made 16 trips a year, what was the total distance covered?

15. I purchased a lot for $1,675. I then built a house upon it, paying $986 for mason work, $4,358 for carpenter work, $835 for plumbing, $1,564 for decorating, $595 for painting, and $648 for other items. I then sold the property at a loss of $1,075. What was the selling price?

16. In New York State a bushel of wheat weighs 60 lb., of oats 32 lb., of corn 58 lb., of rye 56 lb., and of barley 48 lb. Find the total weight of a shipment of 98 bu. of wheat, 156 bu. of oats, 125 bu. of corn, 78 bu. of rye, and 147 bu. of barley.

17. A commission agent received a consignment of 4,500 lb. of potatoes, 5,208 lb. of beans, and 2,592 lb. of buckwheat. If the weight of a bushel of potatoes is 60 lb., of beans 62 lb., and of buckwheat 48 lb., find the number of bushels of each in the consignment. Find the amount of the freight charge at 18 cents per hundred pounds.

18. A train ran 1710 miles in 38 hr. At the same rate of speed, how long would it require to run a distance of 1,305 miles?

19. A farmer sold 5 loads of hay weighing respectively 2184 lb., 1076 lb., 1275 lb., 2006 lb., and 1459 lb. How much did he receive for the hay at $16 per ton?

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20. Copy, complete and receipt the following bill:

Buffalo, N. Y., May 5, 1913.

John R. Raymond,

To Frank S. Dunlap, Dr.

Apr. 27	24 bu. corn @ 48¢ per bu.		
	15 bu. wheat @ 95¢ per bu.		
	18 bu. barley @ 56¢ per bu.		
	25 bu. oats @ 32¢ per bu.		
	12 bu. rye @ 85¢ per bu.		

21. Three brothers formed a partnership. The first contributed $6750 of the capital; the second $1275 more than the first; and the third $2150 less than the second. What was the amount of the capital?

22. I sold 278 acres of land for $20,000 which was a gain of $1096. What did it cost me per acre? At the same price per acre what did I pay for 350 acres?

23. Taking the two numbers 4453 and 73 find (*a*) their sum, (*b*) their difference, (*c*) their product, (*d*) the quotient of the first divided by the second.

24. A motorcyclist traveling at an average rate of 18 miles per hour, rode 4 hours the first day, 7 hours the second day, 9 hours the third day and 3 hours the fourth day. How far did he travel?

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PRIME FACTORS

Find the prime factors of:

1. 32.
2. 56.
3. 72.
4. 92.
5. 134.
6. 136.
7. 138.
8. 141.
9. 230.
10. 378.
11. 429.
12. 642.
13. 702.
14. 795.
15. 846.
16. 1260.
17. 3003.
18. 4350.
19. 7020.
20. 7110.

GREATEST COMMON DIVISOR

Find by factoring, the greatest common divisor of:

1. 27, 36, 45.
2. 26, 39, 52.
3. 45, 54, 63.
4. 51, 54, 57.
5. 111, 117, 120.
6. 78, 117, 156.
7. 108, 288, 396.
8. 84, 105, 126.
9. 126, 198, 264.
10. 1080, 1485.
11. 324, 480, 564.
12. 13, 91, 169.
13. 132, 119, 125.
14. 180, 252, 756.
15. 216, 252, 396.
16. 168, 210, 252.
17. 96, 128, 160, 192.
18. 192, 288, 384, 576.
19. 96, 192, 120, 240.
20. 110, 264, 330, 660.

Find by division the greatest common divisor of:

21. 459 and 1530.
22. 924 and 5049.
23. 2730 and 3549.
24. 4416 and 5376.
25. 3696 and 5852.
26. 1892 and 3096.
27. 2405 and 6660.
28. 4422 and 6834.
29. 1998 and 3219.
30. 333, 888, and 1,221.
31. 448, 784, and 1,008.
32. 918, 1,530, and 2,346.
33. 308, 2,420, and 1,683.
34. 455, 780, and 1,183.
35. 1,287, 4,158, and 4,488.
36. 221, 493, and 799.

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Problems

1. What is the capacity of the largest container that will exactly measure 180, 240, or 300 gal. of oil?

2. Three tracts of land containing 480, 576 and 1,920 acres respectively, were divided into farms of the largest possible size to contain an equal number of acres. What was the size of each farm?

3. A farmer wishes to put 120 bu. of wheat, 144 bu. of corn, and 240 bu. of oats into the smallest number of bins possible of uniform size, without mixing the grains. How many bushels must each bin hold?

4. Find the longest measure that may be used in measuring 333 ft., 363 ft., or 381 ft. of carpet.

5. What is the coin of largest value that may be used in counting out $1.25, $1.35, or $1.50?

6. How many boards of the longest possible equal length and of the same width will enclose a rectangular field 9,893 ft. by 8,047 ft. with a straight fence, six boards high?

7. The four sides of my garden are 84 ft., 156 ft., 108 ft., and 132 ft. respectively. What is the greatest length of boards that I can use in fencing it, without cutting any of them?

8. What is the largest number that will exactly divide 629, 1,037 and 493?

9. Find the greatest common divisor of 675, 900 and 1,125.

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LEAST COMMON MULTIPLE

Find the least common multiple of:

1. 6, 12, 24, 30.
2. 12, 24, 36, 48.
3. 45, 54, 63, 90.
4. 60, 70, 80, 90.
5. 270, 162, 189.
6. 160, 168, 184.
7. 144, 256, 320.
8. 198, 264, 126.
9. 720, 900, 1,080.
10. 512, 288, 640.
11. 216, 576, 792.
12. 190, 285, 475.
13. 168, 252, 210.
14. 99, 189, 405.
15. 224, 336, 240.
16. 192, 288, 384, 576.
17. 108, 144, 180, 216.
18. 96, 120, 240, 192.
19. 264, 330, 440, 660.
20. 55, 132, 165, 330.

21. What is the shortest length that can be exactly measured by a 12-inch, a 15-inch, or an 18-inch measure?

22. Three boys, starting at the same time, walked around a race-course in 18 min., 21 min., and 24 min. respectively. After what length of time could they all meet at the starting point, and how many times would each have made the circuit?

23. Find the contents of the smallest vessel that may be filled by using a 4-quart, a 6-quart, or an 8-quart measure.

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24. What is the smallest sum of money that can be separated into 5-dollar, 10-dollar, 20-dollar, or 25-dollar parts?

25. Find the shortest length of ribbon that can be cut into 27-inch, 36-inch, or 48-inch pieces.

26. What is the frontage of the smallest piece of land that can be separated into 25-foot, 30-foot, or 35-foot lots?

27. Find the least number of bushels of grain that can be exactly measured either by a four-quart, a peck, or a half bushel measure.

28. What is the shortest length of fence that can be made with boards 11, 12, and 14 ft. long?

29. What is the contents of the smallest box that may be exactly filled by a 2-quart, 8-quart, 12-quart, or half bushel measure?

30. What is the width in yards of the narrowest floor upon which carpet 27 in., 30 in., or 36 in. wide can be placed without waste?

31. What is the smallest amount of money that can be placed in packages each containing 20, 25 or 50 1-cent pieces?

32. Find the smallest amount of grain that can be placed in bags containing 25 lb., 48 lb. or 98 lb. each.

33. What is the length of the shortest rope that can be cut into 15-foot, 24-foot or 36-foot pieces?

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CANCELLATION

1. $\frac{13 \times 4 \times 45}{20 \times 26 \times 9}$.

2. $\frac{7 \times 11 \times 4 \times 3}{22 \times 8 \times 9 \times 28}$.

3. $\frac{5 \times 6 \times 30}{36 \times 20 \times 15}$.

4. $\frac{9 \times 39 \times 5}{13 \times 15 \times 72}$.

5. $\frac{6 \times 13 \times 7}{91 \times 15 \times 50}$.

6. $\frac{4 \times 13 \times 38 \times 3}{19 \times 39 \times 8}$.

7. $\frac{7 \times 51 \times 19}{17 \times 76 \times 49}$.

8. $\frac{14 \times 26 \times 10}{22 \times 52 \times 63}$.

9. $\frac{4 \times 69 \times 14 \times 35}{23 \times 44 \times 2 \times 28}$.

10. $\frac{99 \times 75 \times 11 \times 61}{100 \times 122 \times 13 \times 33}$.

11. $\frac{51 \times 49 \times 13}{98 \times 65 \times 204}$.

12. $\frac{47 \times 64 \times 13}{52 \times 4 \times 188}$.

13. $\frac{17 \times 117 \times 100 \times 21}{39 \times 105 \times 153}$.

14. $\frac{43 \times 39 \times 9}{45 \times 129 \times 117}$.

15. $\frac{37 \times 23 \times 16 \times 41}{82 \times 92 \times 23 \times 74}$.

16. $\frac{16 \times 37 \times 51}{44 \times 68 \times 111}$.

17. $\frac{23 \times 16 \times 5 \times 13}{26 \times 46 \times 20}$.

18. $\frac{19 \times 12 \times 52}{39 \times 4 \times 76}$.

19. $\frac{17 \times 31 \times 132}{124 \times 51 \times 22}$.

20. $\frac{19 \times 17 \times 6 \times 10}{34 \times 57 \times 5 \times 2}$.

21. $\frac{30 \times 36 \times 72 \times 90}{24 \times 70 \times 96 \times 144}$.

22. $\frac{8 \times 16 \times 24 \times 32}{16 \times 80 \times 96 \times 104}$.

23. $\frac{45 \times 54 \times 63 \times 90}{90 \times 99 \times 108 \times 117}$.

24. $\frac{14 \times 21 \times 28 \times 63}{15 \times 42 \times 35 \times 49}$.

25. $\frac{81 \times 162 \times 243}{204 \times 216 \times 228}$.

26. $\frac{14 \times 27 \times 18 \times 45}{21 \times 36 \times 15 \times 30}$.

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Solve by cancellation:

27. Multiply 56 by 99 and divide the product by 8 times 11.

28. Divide 27 times 51 times 48 by 18 times 32 times 56.

29. $54 \times 58 \times 36 \times 70$ is how many times $12 \times 18 \times 29 \times 56$?

30. Divide the product of $12 \times 36 \times 63 \times 75$ by the product of $9 \times 25 \times 54 \times 72$.

31. Find the quotient of $17 \times 35 \times 39 \times 42$ divided by $7 \times 51 \times 39 \times 84$.

32. A pile of wood is 224 ft. long, 12 ft. wide, and 8 ft. high. Find the number of cords which it contains, a cord being 8 ft. by 4 ft. by 4 ft.

33. Find the cost of excavating a cellar 24 ft. long, 18 ft. wide, and 8 ft. deep, at $ .25 a cubic yard.

34. If 12 men can do a certain amount of work in 30 da. by working 9 hr. a day, how many men could do the same work in 15 da. by working 8 hr. a day?

35. 500 bbl. of flour, each weighing 196 lb., were given in exchange for 150 bbl. of meat, each weighing 200 lb. If the flour was worth 3 cents a pound, what was the meat worth?

36. A cellar is 24 ft. long, 16 ft. wide, and 8 ft. deep. How deep must another cellar be that is 20 ft. long and 15 ft. wide, in order that the capacity of both cellars may be the same?

37. How many times as much will a bin contain whose dimensions are 20 ft., 12 ft., and 8 ft., as one whose dimensions are 5 ft. by 4 ft. by 3 ft.?

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Reductions of Fractions

Reduce to lowest terms:

1. $\frac{6}{12}$
2. $\frac{4}{20}$
3. $\frac{7}{21}$
4. $\frac{18}{27}$
5. $\frac{16}{24}$
6. $\frac{16}{20}$
7. $\frac{18}{20}$
8. $\frac{15}{20}$
9. $\frac{2}{28}$
10. $\frac{8}{28}$
11. $\frac{2}{32}$
12. $\frac{6}{32}$
13. $\frac{10}{32}$
14. $\frac{12}{32}$
15. $\frac{20}{32}$
16. $\frac{24}{32}$
17. $\frac{28}{32}$
18. $\frac{6}{33}$
19. $\frac{4}{34}$
20. $\frac{10}{35}$
21. $\frac{8}{36}$
22. $\frac{8}{36}$
23. $\frac{12}{36}$
24. $\frac{21}{36}$
25. $\frac{27}{36}$
26. $\frac{12}{40}$
27. $\frac{16}{40}$
28. $\frac{18}{42}$
29. $\frac{20}{60}$
30. $\frac{54}{72}$

Reduce:

1. To 12ths: $\frac{1}{2}$; $\frac{2}{3}$; $\frac{3}{4}$; $\frac{5}{6}$.
2. To 16ths: $\frac{1}{2}$; $\frac{3}{4}$; $\frac{3}{8}$; $\frac{7}{8}$.
3. To 20ths: $\frac{1}{2}$; $\frac{3}{4}$; $\frac{4}{5}$; $\frac{9}{10}$.
4. To 18ths: $\frac{1}{2}$; $\frac{2}{3}$; $\frac{5}{6}$; $\frac{7}{9}$.
5. To 24ths: $\frac{2}{3}$; $\frac{3}{4}$; $\frac{5}{6}$; $\frac{7}{8}$.
6. To 28ths: $\frac{1}{2}$; $\frac{3}{4}$; $\frac{6}{7}$; $\frac{11}{14}$.
7. To 30ths: $\frac{2}{3}$; $\frac{4}{5}$; $\frac{5}{6}$; $\frac{7}{15}$.
8. To 36ths: $\frac{3}{4}$; $\frac{5}{6}$; $\frac{7}{9}$; $\frac{7}{12}$.
9. To 60ths: $\frac{4}{5}$; $\frac{5}{6}$; $\frac{9}{10}$; $\frac{11}{15}$.
10. To 72nds: $\frac{5}{6}$; $\frac{7}{8}$; $\frac{8}{9}$; $\frac{7}{12}$.
11. To 48ths: $\frac{5}{6}$; $\frac{7}{8}$; $\frac{5}{12}$; $\frac{9}{16}$.
12. To 60ths: $\frac{2}{3}$; $\frac{3}{4}$; $\frac{5}{12}$; $\frac{7}{15}$.
13. To 70ths: $\frac{1}{2}$; $\frac{3}{5}$; $\frac{2}{7}$; $\frac{9}{14}$.

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Reduce to integers or mixed numbers:

1. $\frac{12}{8}$
2. $\frac{27}{8}$
3. $\frac{26}{4}$
4. $\frac{88}{12}$
5. $\frac{14}{3}$
6. $\frac{48}{8}$
7. $\frac{49}{6}$
8. $\frac{16}{7}$
9. $\frac{44}{12}$
10. $\frac{81}{8}$
11. $\frac{50}{20}$
12. $\frac{56}{9}$
13. $\frac{40}{8}$
14. $\frac{50}{8}$
15. $\frac{60}{21}$
16. $\frac{70}{24}$
17. $\frac{15}{6}$
18. $\frac{50}{8}$
19. $\frac{51}{10}$
20. $\frac{45}{7}$
21. $\frac{88}{10}$
22. $\frac{80}{25}$
23. $\frac{19}{7}$
24. $\frac{92}{9}$
25. $\frac{94}{12}$
26. $\frac{85}{27}$
27. $\frac{55}{26}$
28. $\frac{87}{10}$
29. $\frac{48}{25}$
30. $\frac{40}{24}$

Reduce to improper fractions:

1. $2\frac{3}{5}$.
2. $1\frac{7}{8}$.
3. $3\frac{2}{5}$.
4. $4\frac{3}{5}$.
5. $6\frac{1}{2}$.
6. $7\frac{5}{8}$.
7. $5\frac{3}{5}$.
8. $4\frac{3}{4}$.
9. $11\frac{3}{6}$.
10. $7\frac{1}{6}$.
11. $9\frac{5}{8}$.
12. $9\frac{7}{8}$.
13. $8\frac{5}{7}$.
14. $15\frac{6}{7}$.
15. $13\frac{5}{8}$.
16. $14\frac{5}{7}$.
17. $5\frac{3}{5}$.
18. $16\frac{9}{10}$.
19. $18\frac{7}{12}$.
20. $17\frac{8}{11}$.
21. $12\frac{4}{5}$.
22. $10\frac{2}{5}$.
23. $20\frac{8}{10}$.
24. $22\frac{4}{12}$.
25. $15\frac{8}{10}$.
26. $7\frac{4}{5}$.
27. $8\frac{7}{8}$.
28. $20\frac{3}{4}$.
29. $25\frac{2}{3}$.
30. $50\frac{3}{4}$.

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Reduce to equivalent, similar fractions having the L. C. D.

1. $\frac{1}{2}$; $\frac{3}{4}$; $\frac{7}{8}$.
2. $\frac{1}{4}$; $\frac{1}{3}$; $\frac{1}{2}$; $\frac{1}{6}$.
3. $\frac{1}{2}$; $\frac{2}{3}$; $\frac{3}{4}$; $\frac{5}{6}$.
4. $\frac{3}{8}$; $\frac{5}{12}$; $\frac{2}{3}$.
5. $\frac{3}{8}$; $\frac{1}{2}$; $\frac{7}{8}$; $\frac{3}{4}$.
6. $\frac{3}{4}$; $\frac{1}{2}$; $\frac{4}{5}$; $\frac{9}{10}$.
7. $\frac{1}{2}$; $\frac{2}{3}$; $\frac{5}{6}$; $\frac{7}{9}$.
8. $\frac{5}{6}$; $\frac{7}{8}$; $\frac{3}{4}$.
9. $\frac{2}{3}$; $\frac{3}{4}$; $\frac{5}{6}$; $\frac{7}{8}$.
10. $\frac{1}{3}$; $\frac{3}{4}$; $\frac{5}{8}$; $\frac{5}{12}$.
11. $\frac{1}{2}$; $\frac{3}{4}$; $\frac{6}{7}$; $\frac{11}{14}$.
12. $\frac{3}{8}$; $\frac{3}{4}$; $\frac{5}{8}$; $\frac{1}{2}$.
13. $\frac{4}{5}$; $\frac{2}{3}$; $\frac{7}{15}$.
14. $\frac{1}{2}$; $\frac{1}{4}$; $\frac{2}{3}$; $\frac{5}{6}$.
15. $\frac{1}{2}$; $\frac{2}{3}$; $\frac{3}{4}$; $\frac{3}{8}$.
16. $\frac{3}{4}$; $\frac{5}{14}$; $\frac{5}{7}$; $\frac{9}{28}$.
17. $\frac{1}{4}$; $\frac{7}{20}$; $\frac{3}{5}$; $\frac{9}{10}$.
18. $\frac{2}{3}$; $\frac{1}{6}$; $\frac{5}{18}$; $\frac{7}{9}$.
19. $\frac{5}{12}$; $\frac{7}{24}$; $\frac{5}{8}$; $\frac{5}{6}$.
20. $\frac{3}{8}$; $\frac{3}{4}$; $\frac{1}{2}$; $\frac{9}{16}$.

Principles of Fractions

1. State the effect of multiplying the numerator of a fraction by any number; the denominator.

2. State the effect of dividing the numerator of a fraction by any number; the denominator.

3. State the effect of multiplying both terms of a fraction by the same number; of dividing both terms by the same number.

4. State two ways of multiplying a fraction by any number.

5. State two ways of dividing a fraction by any number.

6. State two changes that may be made in any fraction without changing the value of the fraction.

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Multiply each of the following in two ways:

1. $2 \times \frac{3}{8}$.
2. $2 \times \frac{5}{6}$.
3. $3 \times \frac{4}{5}$.
4. $4 \times \frac{1}{8}$.
5. $3 \times \frac{5}{6}$.
6. $4 \times \frac{3}{8}$.
7. $2 \times \frac{7}{10}$.
8. $3 \times \frac{5}{12}$.
9. $6 \times \frac{7}{12}$.
10. $3 \times \frac{2}{15}$.
11. $6 \times \frac{11}{12}$.
12. $8 \times \frac{3}{16}$.
13. $7 \times \frac{10}{21}$.
14. $10 \times \frac{3}{20}$.
15. $9 \times \frac{4}{27}$.
16. $5 \times \frac{11}{15}$.
17. $6 \times \frac{7}{18}$.
18. $8 \times \frac{5}{24}$.

Divide each of the following in two ways:

1. $\frac{3}{7} \div 2$.
2. $\frac{3}{4} \div 3$.
3. $\frac{6}{7} \div 3$.
4. $\frac{8}{9} \div 2$.
5. $\frac{4}{5} \div 4$.
6. $\frac{6}{5} \div 2$.
7. $\frac{10}{3} \div 5$.
8. $\frac{12}{7} \div 4$.
9. $\frac{5}{9} \div 5$.
10. $\frac{12}{7} \div 6$.
11. $\frac{15}{4} \div 5$.
12. $\frac{18}{5} \div 9$.
13. $\frac{14}{15} \div 7$.
14. $\frac{10}{15} \div 10$.
15. $\frac{16}{3} \div 8$.
16. $\frac{15}{7} \div 5$.
17. $\frac{18}{7} \div 6$.
18. $\frac{20}{21} \div 4$.

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State what must be done to the first fraction in each example to obtain the second. Give the reason for each example.

1. $\frac{2}{3} = \frac{8}{12}$.
2. $\frac{1}{2} = \frac{5}{10}$.
3. $\frac{9}{12} = \frac{3}{4}$.
4. $\frac{4}{5} = \frac{12}{15}$.
5. $\frac{8}{10} = \frac{4}{5}$.
6. $\frac{4}{4} = \frac{8}{8}$.
7. $\frac{4}{6} = \frac{2}{3}$.
8. $\frac{9}{15} = \frac{3}{5}$.
9. $\frac{7}{8} = \frac{14}{16}$.
10. $\frac{2}{7} = \frac{6}{21}$.
11. $\frac{10}{12} = \frac{5}{6}$.
12. $\frac{6}{12} = \frac{1}{2}$.
13. $\frac{2}{5} = \frac{12}{30}$.
14. $\frac{14}{16} = \frac{7}{8}$.
15. $\frac{10}{10} = \frac{2}{2}$.
16. $\frac{12}{16} = \frac{4}{8}$.

1. Find the cost of 4 yd. of lace at $\$\frac{3}{8}$ a yard.

2. If a train travels $\frac{10}{12}$ mi. in a minute, how far will it travel in 6 minutes?

3. I paid $\$\frac{8}{10}$ for 4 books. What was the cost of 1 book?

4. A boy rode his bicycle $\frac{160}{128}$ mi. in 8 min. How far did he ride in 1 min.?

5. There were $\frac{15}{18}$ bu. of wheat in each of 8 baskets. How much wheat in all?

6. If one chair costs $\$\frac{3}{4}$, how much will 9 chairs cost?

7. If a train moves at the rate of $\frac{5}{8}$ mi. a minute, how far will it travel in 11 min.?

8. $\frac{24}{4}$ gal. of vinegar was placed in 8 jugs. How much vinegar was placed in each jug?

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Addition of Fractions (Abstract)

1. $\frac{1}{2} + \frac{1}{3} + \frac{1}{4}$.
2. $\frac{2}{5} + \frac{3}{4} + \frac{3}{5}$.
3. $\frac{7}{8} + \frac{1}{3} + \frac{2}{5}$.
4. $\frac{3}{5} + \frac{5}{6} + \frac{8}{9}$.
5. $\frac{2}{3} + \frac{3}{8} + \frac{4}{5}$.
6. $\frac{7}{8} + \frac{5}{6} + \frac{3}{5}$.
7. $\frac{3}{9} + \frac{5}{7} + \frac{8}{9}$.
8. $\frac{7}{8} + \frac{3}{12} + \frac{5}{6}$.
9. $\frac{3}{12} + \frac{1}{8} + \frac{1}{7}$.
10. $\frac{4}{9} + \frac{4}{8} + \frac{7}{12}$.
11. $\frac{3}{7} + \frac{4}{6} + \frac{1}{9}$.
12. $\frac{9}{10} + \frac{3}{5} + \frac{3}{8}$.
13. $\frac{5}{12} + \frac{4}{9} + \frac{7}{8}$.
14. $\frac{7}{12} + \frac{4}{9} + \frac{5}{6}$.
15. $\frac{5}{6} + \frac{3}{8} + \frac{5}{12}$.
16. $\frac{3}{4} + \frac{4}{5} + \frac{9}{10}$.
17. $\frac{5}{6} + \frac{3}{8} + \frac{7}{9}$.
18. $\frac{3}{4} + \frac{7}{8} + \frac{5}{6}$.
19. $\frac{6}{7} + \frac{3}{4} + \frac{11}{14}$.
20. $\frac{1}{2} + \frac{3}{4} + \frac{7}{9} + \frac{3}{8}$.
21. $\frac{5}{8} + \frac{1}{4} + \frac{7}{12} + \frac{3}{5}$.
22. $\frac{1}{3} + \frac{5}{6} + \frac{5}{12} + \frac{2}{9}$.
23. $\frac{3}{8} + \frac{3}{4} + \frac{1}{8} + \frac{5}{6}$.
24. $\frac{3}{4} + \frac{5}{8} + \frac{1}{2} + \frac{7}{12}$.
25. $\frac{5}{12} + \frac{4}{9} + \frac{7}{18} + \frac{3}{8}$.
26. $\frac{5}{18} + \frac{7}{12} + \frac{3}{10} + \frac{3}{4}$.
27. $\frac{6}{7} + \frac{5}{6} + \frac{2}{21} + \frac{9}{14}$.
28. $\frac{5}{9} + \frac{3}{8} + \frac{1}{18} + \frac{1}{12}$.
29. $\frac{3}{5} + \frac{2}{15} + \frac{7}{10} + \frac{5}{6}$.
30. $\frac{5}{6} + \frac{6}{5} + \frac{10}{15} + \frac{15}{10}$.
31. $\frac{4}{9} + \frac{5}{6} + \frac{7}{12} + \frac{1}{18}$.
32. $\frac{10}{11} + \frac{20}{33} + \frac{7}{22} + \frac{5}{6}$.
33. $\frac{2}{15} + \frac{7}{30} + \frac{1}{25} + \frac{3}{50}$.
34. $\frac{4}{7} + \frac{2}{35} + \frac{2}{15} + \frac{5}{21}$.
35. $\frac{4}{5} + \frac{2}{3} + \frac{5}{6} + \frac{7}{15}$.
36. $\frac{7}{9} + \frac{7}{12} + \frac{3}{4} + \frac{5}{6}$.
37. $\frac{4}{5} + \frac{9}{10} + \frac{5}{6} + \frac{11}{15}$.
38. $\frac{8}{9} + \frac{5}{6} + \frac{7}{8} + \frac{7}{12}$.

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Addition of Mixed Numbers (Abstract)

1. $3\frac{1}{2} + 7\frac{2}{3}$.
2. $4\frac{1}{3} + 6\frac{3}{4}$.
3. $5\frac{2}{3} + 1\frac{5}{8}$.
4. $8\frac{2}{7} + 4\frac{3}{5}$.
5. $1\frac{3}{4} + 5\frac{5}{8}$.
6. $7\frac{4}{5} + 12\frac{2}{3}$.
7. $3\frac{1}{8} + 10\frac{7}{12}$.
8. $6\frac{3}{5} + 14\frac{1}{10} + 11\frac{4}{15}$.
9. $9\frac{2}{3} + 17\frac{5}{6} + 20\frac{4}{9}$.
10. $12\frac{3}{4} + 26\frac{5}{8} + 8\frac{7}{12}$.
11. $5\frac{5}{6} + 19\frac{7}{12} + 10\frac{8}{9}$.
12. $17\frac{2}{3} + 24\frac{1}{6} + 2\frac{5}{12}$.
13. $20\frac{7}{8} + 15\frac{3}{4} + 7\frac{3}{10}$.
14. $27\frac{3}{4} + 8\frac{2}{5} + 20\frac{5}{6}$.
15. $9\frac{2}{3} + 22\frac{4}{5} + 7\frac{1}{4}$.
16. $30\frac{3}{4} + 4\frac{2}{7} + 19\frac{2}{3}$.
17. $6\frac{1}{4} + 7\frac{2}{5} + 35\frac{4}{9}$.
18. $17\frac{3}{8} + 2\frac{7}{15} + 25\frac{7}{20}$.
19. $13\frac{5}{6} + 35\frac{1}{12} + \frac{4}{15}$.
20. $10\frac{2}{5} + 4\frac{7}{15} + 26\frac{5}{18}$.
21. $4\frac{7}{18} + \frac{5}{6} + 50\frac{7}{12}$.
22. $8\frac{4}{5} + 19\frac{7}{20} + \frac{9}{25}$.
23. $30\frac{5}{6} + 4\frac{2}{15} + 11\frac{3}{10}$.
24. $6\frac{3}{10} + \frac{9}{20} + 17\frac{4}{15}$.
25. $17\frac{7}{8} + \frac{3}{20} + 20\frac{7}{12}$.
26. $3\frac{5}{6} + 29\frac{5}{12} + 17\frac{9}{16}$.

Subtraction of Fractions (Abstract)

1. $\frac{1}{2} - \frac{1}{3}$.
2. $\frac{1}{2} - \frac{1}{4}$.
3. $\frac{1}{3} - \frac{1}{4}$.
4. $\frac{1}{2} - \frac{1}{5}$.
5. $\frac{1}{4} - \frac{1}{5}$.
6. $\frac{2}{3} - \frac{1}{4}$.
7. $\frac{3}{4} - \frac{2}{5}$.
8. $\frac{3}{4} - \frac{3}{5}$.
9. $\frac{2}{3} - \frac{1}{2}$.
10. $\frac{3}{4} - \frac{3}{5}$.
11. $\frac{1}{5} - \frac{1}{6}$.
12. $\frac{3}{5} - \frac{1}{2}$.
13. $\frac{4}{5} - \frac{2}{3}$.
14. $\frac{2}{3} - \frac{1}{6}$.
15. $\frac{5}{6} - \frac{1}{3}$.
16. $\frac{5}{6} - \frac{4}{5}$.
17. $\frac{2}{3} - \frac{4}{5}$.
18. $\frac{4}{5} - \frac{1}{6}$.
19. $\frac{4}{5} - \frac{1}{2}$.
20. $\frac{5}{6} - \frac{2}{3}$.
21. $\frac{7}{8} - \frac{5}{6}$.
22. $\frac{4}{5} - \frac{1}{3}$.
23. $\frac{9}{10} - \frac{7}{8}$.
24. $\frac{7}{10} - \frac{3}{5}$.
25. $\frac{11}{12} - \frac{9}{10}$.
26. $\frac{11}{20} - \frac{5}{18}$.
27. $\frac{37}{40} - \frac{4}{35}$.
28. $\frac{49}{50} - \frac{3}{4}$.
29. $\frac{3}{4} - \frac{3}{50}$.
30. $\frac{9}{100} - \frac{2}{75}$.

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Subtraction of Mixed Numbers (Abstract)

1. $17\frac{1}{2} - 9\frac{1}{3}$.
2. $10\frac{1}{2} - 9\frac{1}{4}$.
3. $13\frac{1}{3} - 7\frac{1}{4}$.
4. $12\frac{1}{6} - 6\frac{2}{3}$.
5. $16\frac{1}{5} - 7\frac{1}{2}$.
6. $17\frac{1}{4} - 8\frac{1}{5}$.
7. $18\frac{2}{3} - 9\frac{1}{4}$.
8. $15\frac{2}{5} - 9\frac{3}{4}$.
9. $10\frac{5}{8} - 8\frac{4}{7}$.
10. $14\frac{2}{3} - 7\frac{3}{4}$.
11. $20\frac{3}{4} - \frac{3}{5}$.
12. $23\frac{4}{5} - 18\frac{5}{6}$.
13. $26\frac{1}{6} - 8\frac{1}{5}$.
14. $29\frac{4}{6} - 9\frac{3}{5}$.
15. $32\frac{1}{2} - 19\frac{3}{5}$.
16. $35\frac{1}{6} - 8\frac{4}{5}$.
17. $38\frac{4}{5} - \frac{2}{3}$.
18. $41\frac{1}{2} - 25\frac{4}{5}$.
19. $44\frac{1}{6} - 15\frac{2}{3}$.
20. $47\frac{1}{4} - 12\frac{5}{6}$.
21. $50\frac{2}{3} - 30\frac{5}{6}$.
22. $53\frac{7}{8} - 14\frac{5}{6}$.
23. $56\frac{3}{4} - 36\frac{4}{5}$.
24. $59\frac{7}{10} - 10\frac{7}{8}$.
25. $62\frac{3}{5} - 37\frac{7}{10}$.
26. $70\frac{5}{18} - 44\frac{9}{20}$.
27. $73\frac{4}{35} - 58\frac{39}{40}$.
28. $85\frac{3}{4} - 67\frac{47}{50}$.
29. $91\frac{1}{50} - \frac{3}{4}$.
30. $100\frac{3}{75} - 80\frac{19}{100}$.
31. $75\frac{2}{5} - 20\frac{9}{14}$.
32. $76\frac{3}{5} - 14\frac{3}{7}$.
33. $90\frac{5}{12} - 89\frac{7}{15}$.
34. $112\frac{5}{12} - 93\frac{7}{8}$.
35. $104\frac{9}{16} - 57\frac{5}{6}$.
36. $63\frac{7}{8} - 15\frac{8}{9}$.
37. $218\frac{5}{6} - 137\frac{9}{10}$.
38. $179\frac{7}{15} - 87\frac{5}{6}$.

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Multiplication of Fractions (Abstract)

1. $\frac{1}{3} \times \frac{1}{2}$.
2. $\frac{1}{4} \times \frac{1}{3}$.
3. $\frac{1}{6} \times \frac{1}{7}$.
4. $\frac{1}{10} \times \frac{1}{11}$.
5. $\frac{1}{12} \times \frac{1}{8}$.
6. $\frac{2}{9} \times \frac{2}{7}$.
7. $\frac{3}{8} \times \frac{2}{5}$.
8. $\frac{5}{11} \times \frac{1}{9}$.
9. $\frac{6}{7} \times \frac{7}{8}$.
10. $\frac{8}{9} \times \frac{9}{10}$.
11. $\frac{10}{12} \times \frac{3}{8}$.
12. $\frac{9}{7} \times \frac{7}{12}$.
13. $\frac{7}{12} \times \frac{5}{7}$.
14. $\frac{7}{12} \times \frac{8}{15} \times \frac{1}{7}$.
15. $\frac{3}{7} \times \frac{14}{15} \times \frac{9}{6}$.
16. $\frac{5}{8} \times \frac{3}{5} \times \frac{4}{27}$.
17. $\frac{4}{5} \times \frac{1}{12} \times \frac{25}{20}$.
18. $\frac{2}{3} \times \frac{7}{25} \times \frac{2}{21}$.
19. $\frac{2}{6} \times \frac{18}{20} \times \frac{75}{100}$.
20. $\frac{3}{5} \times \frac{10}{15} \times \frac{8}{7}$.
21. $\frac{3}{8} \times \frac{1}{9} \times \frac{4}{50}$.
22. $\frac{11}{12} \times \frac{15}{3} \times \frac{60}{75}$.
23. $\frac{4}{9} \times \frac{27}{30} \times \frac{7}{100}$.
24. $\frac{3}{5} \times \frac{1}{20} \times \frac{35}{50}$.
25. $\frac{20}{4} \times \frac{36}{75} \times \frac{45}{90}$.
26. $\frac{2}{3} \times 25$.
27. $\frac{3}{4} \times 15$.
28. $\frac{7}{8} \times 25$.
29. $\frac{5}{8} \times 50$.
30. $\frac{2}{3} \times 50$.
31. $\frac{3}{4} \times 25$.
32. $\frac{2}{3} \times 45$.
33. $\frac{7}{8} \times 98$.
34. $\frac{5}{8} \times 25$.
35. $\frac{3}{4} \times 18$.
36. $\frac{2}{3} \times \frac{25}{2}$.
37. $\frac{3}{8} \times 25$.
38. $\frac{7}{8} \times 50$.
39. $\frac{5}{8} \times \frac{25}{2}$.
40. $\frac{2}{3} \times 75$.
41. $\frac{3}{4} \times 98$.
42. $\frac{3}{8} \times 50$.
43. $\frac{7}{8} \times 15$.
44. $\frac{2}{3} \times 98$.
45. $\frac{3}{8} \times 98$.
46. $\frac{3}{4} \times 25$.
47. $\frac{7}{8} \times 35$.
48. $\frac{2}{3} \times 99$.
49. $\frac{5}{8} \times 75$.
50. $\frac{3}{4} \times \frac{25}{2}$.

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Multiplication of Mixed Numbers (Abstract)

1. $4\frac{1}{3} \times 3\frac{1}{8}$.
2. $7\frac{1}{4} \times \frac{2}{3}$.
3. $\frac{1}{2} \times 17\frac{5}{8}$.
4. $10\frac{1}{3} \times 6\frac{2}{3}$.
5. $16\frac{2}{3} \times \frac{3}{4}$.
6. $3\frac{2}{5} \times 4\frac{2}{12}$.
7. $20\frac{3}{4} \times 10\frac{1}{9}$.
8. $25\frac{3}{8} \times 12\frac{2}{5}$.
9. $2\frac{1}{3} \times 2\frac{3}{5}$.
10. $8\frac{5}{8} \times \frac{7}{8}$.
11. $12\frac{2}{3} \times 8\frac{2}{15}$.
12. $25\frac{4}{5} \times 1\frac{3}{12}$.
13. $10\frac{2}{4} \times 5\frac{2}{3}$.
14. $11\frac{3}{5} \times 20\frac{7}{8}$.
15. $14\frac{1}{6} \times 15\frac{6}{7}$.
16. $25\frac{1}{9} \times 7\frac{10}{12}$.
17. $6\frac{2}{7} \times 16\frac{1}{4}$.
18. $15\frac{1}{10} \times 7\frac{1}{2}$.
19. $9\frac{3}{10} \times 12\frac{2}{3}$.
20. $1\frac{2}{3} \times 20$.
21. $50\frac{5}{8} \times 9\frac{2}{3}$.
22. $18\frac{3}{4} \times 9$.
23. $5\frac{7}{8} \times 6$.
24. $13\frac{4}{7} \times \frac{7}{10}$.
25. $30\frac{2}{5} \times 8$.
26. $\frac{5}{12} \times 15\frac{1}{4}$.
27. $15 \times 4\frac{5}{9}$.
28. $30 \times 12\frac{1}{6}$.
29. $\frac{7}{8} \times 8\frac{4}{7}$.
30. $\frac{3}{10} \times 20\frac{5}{6}$.
31. $\frac{2}{3} \times 12\frac{3}{5} \times 4\frac{2}{8}$.
32. $\frac{7}{8} \times 15\frac{6}{7} \times \frac{7}{11}$.
33. $15 \times 8\frac{3}{5} \times \frac{3}{25}$.
34. $14 \times 10\frac{2}{7} \times 9\frac{7}{8}$.
35. $10\frac{2}{3} \times 6\frac{3}{4} \times 15$.
36. $10\frac{1}{6} \times 4\frac{9}{10} \times 2\frac{3}{7}$.
37. $15 \times 24\frac{1}{6} \times 8\frac{2}{3}$.
38. $2\frac{5}{10} \times 15 \times 7\frac{2}{5}$.
39. $1\frac{6}{9} \times 14\frac{2}{8} \times \frac{1}{3}$.
40. $25\frac{2}{3} \times 1\frac{5}{8} \times 10\frac{3}{9}$.

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Division of Fractions (Abstract)

1. $2 \div \frac{1}{3}$.
2. $\frac{1}{3} \div \frac{1}{6}$.
3. $\frac{1}{2} \div \frac{1}{4}$.
4. $15 \div \frac{3}{5}$.
5. $\frac{1}{3} \div \frac{5}{9}$.
6. $\frac{3}{8} \div \frac{5}{8}$.
7. $\frac{3}{8} \div \frac{3}{9}$.
8. $\frac{4}{5} \div \frac{8}{3}$.
9. $\frac{20}{8} \div \frac{5}{16}$.
10. $\frac{12}{15} \div \frac{3}{5}$.
11. $\frac{4}{9} \div \frac{2}{3}$.
12. $\frac{3}{7} \div \frac{10}{14}$.
13. $\frac{7}{12} \div \frac{4}{9}$.
14. $\frac{8}{10} \div \frac{6}{5}$.
15. $\frac{6}{9} \div \frac{12}{10}$.
16. $\frac{10}{4} \div \frac{15}{8}$.
17. $\frac{3}{7} \div \frac{6}{7}$.
18. $\frac{10}{15} \div \frac{4}{12}$.
19. $\frac{5}{7} \div \frac{3}{14}$.
20. $\frac{3}{10} \div \frac{4}{5}$.
21. $\frac{9}{16} \div \frac{15}{8}$.
22. $\frac{7}{10} \div \frac{14}{20}$.
23. $\frac{17}{24} \div \frac{21}{34}$.
24. $\frac{20}{35} \div \frac{12}{14}$.
25. $\frac{15}{50} \div \frac{9}{25}$.
26. $\frac{14}{27} \div \frac{7}{9}$.

Division of Mixed Numbers (Abstract)

1. $15 \div 1\frac{1}{2}$.
2. $10 \div 2\frac{1}{2}$.
3. $15 \div 3\frac{1}{8}$.
4. $2\frac{1}{3} \div 7\frac{1}{8}$.
5. $4\frac{3}{4} \div 1\frac{9}{3}$.
6. $10\frac{2}{3} \div \frac{8}{9}$.
7. $7\frac{1}{5} \div \frac{4}{10}$.
8. $3\frac{4}{5} \div 1\frac{2}{3}$.
9. $\frac{4}{8} \div 1\frac{3}{10}$.
10. $25\frac{1}{2} \div \frac{3}{8}$.
11. $\frac{35}{42} \div 7$.
12. $\frac{19}{25} \div 38$.
13. $\frac{17}{20} \div 51$.
14. $\frac{25}{48} \div 125$.
15. $2\frac{3}{9} \div 5\frac{3}{8}$.
16. $5\frac{2}{7} \div 10\frac{4}{7}$.
17. $72 \div 3\frac{3}{8}$.
18. $81 \div 2\frac{1}{4}$.
19. $7\frac{3}{8} \div \frac{36}{59}$.
20. $18\frac{2}{3} \div 2\frac{2}{3}$.
21. $12\frac{4}{7} \div 11$.
22. $10\frac{3}{5} \div \frac{10}{3}$.
23. $18\frac{1}{3} \div 1\frac{1}{27}$.
24. $9\frac{3}{5} \div 7\frac{1}{2}$.
25. $33\frac{1}{3} \div 3\frac{1}{3}$.
26. $6\frac{4}{7} \div 7\frac{2}{3}$.

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Complex Fractions

Simplify:

1. $\dfrac{\frac{7}{9} \times \frac{8}{10} \times 1\frac{2}{21}}{\frac{2}{3}\frac{2}{3} \div \frac{6}{3\frac{2}{2}}}$.

2. $\dfrac{\frac{8}{25} \times \frac{5}{16} \div \frac{1}{10}}{\frac{1}{2}\frac{3}{6} \div 1\frac{3}{3}\frac{3}{9}}$.

3. $\dfrac{6\frac{3}{4} \div 3}{6\frac{3}{4} \div 2\frac{1}{4} \times 3}$

4. $\dfrac{\frac{8}{12} + \frac{3}{4}}{\frac{1}{3} + \frac{5}{5} + \frac{6}{18}}$.

5. $\dfrac{3\frac{1}{2} + 2\frac{1}{3} - 1\frac{1}{4}}{\frac{3}{2} \times 10\frac{1}{3}} \div 1\frac{3}{5}$.

6. $\dfrac{\frac{7}{16} + 1\frac{1}{2} \times \frac{2}{5} + \frac{1}{8}}{1 \div (\frac{5}{6} - \frac{1}{15})}$.

7. $\dfrac{\dfrac{2 - \frac{1}{6}}{2\frac{2}{3}} \div (2 - 1\frac{3}{5} + \frac{7}{10})}{\frac{3}{4} - \frac{1}{8} \div \frac{1}{2}}$.

8. $(\dfrac{\frac{3}{4} - \frac{2}{3}}{\frac{7}{8} - \frac{3}{4}} + \frac{4}{5} + \frac{3}{5} \times \frac{8}{9}) \div 7$.

9. $\dfrac{2\frac{1}{2} - 1\frac{2}{3}}{\frac{2}{5} \times (\frac{3}{4} - \frac{1}{2})} - \frac{2}{3} \times \frac{5}{8}$.

10. $\dfrac{4\frac{1}{2} + 2\frac{2}{3}}{4\frac{1}{2} \times 2\frac{2}{3}} \times 72$.

Fractions (Addition Problems)

1. A man's farm contained $40\frac{1}{2}$ acres of meadow land, $63\frac{3}{4}$ acres of tilled land, $54\frac{1}{4}$ acres of fruit trees and $74\frac{1}{2}$ acres of woodland. How many acres did the farm contain?

2. Find the total amount of sales made by a clerk who sold goods amounting to \$48$\frac{3}{4}$, \$25$\frac{3}{10}$, \$49$\frac{1}{2}$, \$18$\frac{1}{4}$, and \$36$\frac{7}{10}$.

3. Corn was planted in $9\frac{1}{4}$ A., wheat in $7\frac{3}{4}$ A., rye in $6\frac{1}{2}$ A., potatoes in $8\frac{7}{8}$ A., and cabbages in $5\frac{1}{8}$ A. How much land was used for all?

4. I own fields containing $19\frac{3}{4}$ A., $28\frac{1}{4}$ A., $30\frac{5}{8}$ A., $36\frac{1}{2}$ A., and $39\frac{3}{4}$ A. respectively. How much land do I own?

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5. A dressmaker sewed $8\frac{1}{2}$ hr. Monday, $8\frac{3}{4}$ hr. Tuesday, $9\frac{1}{4}$ hr. Wednesday, $7\frac{2}{3}$ hr. Thursday, 8 hr. Friday, and $8\frac{2}{3}$ hr. Saturday. How many hours did she sew during the week?

6. A owned $\frac{3}{16}$ of a business, B $\frac{1}{12}$ of it, C $\frac{3}{8}$ of it, and D $\frac{1}{4}$ of it. What part of the business was owned by the four men?

7. A chauffeur, on six successive days, drove an automobile $84\frac{3}{4}$ mi., $37\frac{2}{3}$ mi., $23\frac{1}{2}$ mi., 52 mi., $17\frac{3}{8}$ mi., and $46\frac{5}{8}$ mi. Find the total distance.

8. After taking $13\frac{5}{8}$ gallons of vinegar from a barrel $27\frac{3}{4}$ gallons remained. How much vinegar was in the barrel at first?

9. If $79\frac{1}{8}$ be subtracted from a certain number, $156\frac{7}{16}$ will remain. What is the number?

10. A man sold $46\frac{3}{4}$ bushels of his wheat and had left $75\frac{5}{8}$ bushels. What amount of wheat had he at first?

11. A farmer sold $27\frac{3}{8}$ bushels of corn, $46\frac{3}{8}$ more bushels of wheat than of corn, and $15\frac{7}{12}$ more bushels of oats than of wheat. How many bushels of grain did he sell?

12. By selling a load of potatoes for $\$175\frac{3}{4}$, a commission merchant lost $\$48\frac{7}{10}$. For how much should he have sold the potatoes to gain $\$29\frac{3}{8}$?

13. A number of workmen laid railway ties as follows: the first week, $24\frac{3}{4}$ miles; the second, $17\frac{2}{3}$ miles; the third, $16\frac{5}{6}$ miles, the fourth, $20\frac{4}{5}$ miles; the fifth, $17\frac{7}{10}$ miles; the sixth, $23\frac{5}{12}$ miles. How many miles of ties did they lay?

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14. The coal burned in a furnace for six consecutive months weighed $12\frac{7}{20}$ tons, $9\frac{2}{5}$ tons, $17\frac{3}{10}$ tons, $14\frac{5}{8}$ tons, $11\frac{6}{25}$ tons, and $10\frac{3}{4}$ tons respectively. What was the entire weight of the coal?

15. A man's expenses for six months were $\$150\frac{1}{2}$ for rent, $\$478\frac{3}{4}$ for groceries and meat, $\$207\frac{3}{5}$ for clothing and $\$198\frac{3}{8}$ for incidentals. He saved $\$154\frac{1}{4}$. What was his income for the six months?

Fractions (Subtraction Problems)

1. Henry earned $\$38\frac{2}{3}$ a week and John $\$25\frac{3}{4}$ a week. How much more did Henry earn than John?

2. The distance between A and B is $103\frac{3}{5}$ mi. and between B and C is $78\frac{3}{8}$ mi. How far is it from A to C? How much farther from A to B than from B to C?

3. How much change should I receive from ten dollars given in payment for a hat costing $\$3\frac{3}{4}$ and shoes costing $\$4\frac{1}{2}$?

4. From a roll of carpet containing 45 yards, $17\frac{3}{4}$ yd. were sold to one person, $10\frac{1}{2}$ yd. to another, and $8\frac{2}{3}$ yd. to another. How much carpet was left?

5. What number must be added to $37\frac{5}{16}$ to equal $50\frac{1}{3}$?

6. Find the difference between $203\frac{5}{12}$ and $179\frac{5}{8}$.

7. To what number must $29\frac{1}{3}\frac{1}{2}$ be added to equal $45\frac{7}{8}$?

8. A lady made purchases amounting to $\$12\frac{3}{4}$, $\$30\frac{1}{3}$, $\$24\frac{3}{8}$, and $\$76\frac{7}{10}$. She had $\$218\frac{1}{2}$, before making the first purchase. How much had she left after each purchase?

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9. A man walked $16\frac{5}{8}$ miles one day, and $14\frac{3}{4}$ miles the next day. On the following day he walked $2\frac{1}{8}$ miles less than on the second. What distance did he walk in the three days?

10. I purchased a house paying $\frac{1}{4}$ of the cost the first year, $\frac{1}{8}$ of it the second year, and $\frac{1}{6}$ of it the third year. What part of the cost did I still owe?

11. From a farm of $135\frac{5}{16}$ A., $2\frac{3}{8}$ A. were sold at one time $13\frac{1}{2}$ A. at another, and $47\frac{5}{12}$ A. at another. Find the number of acres remaining after each sale.

12. One farm yielded $200\frac{1}{2}$ bushels of wheat and another $19\frac{3}{8}$ bushels less than that. How many bushels did both yield?

13. The greater of two numbers is $279\frac{3}{8}$, and their difference is $89\frac{5}{8}$. What is the smaller number?

14. A farmer picked $137\frac{1}{8}$ bu. of apples and $29\frac{3}{4}$ bu. less than that of pears. He picked $17\frac{3}{8}$ more bushels of pears than of plums. How many plums did he pick?

15. A trader sold a horse for $\$132\frac{1}{2}$, thus gaining $\$25\frac{3}{4}$. How much would he have gained had he sold him for \$150?

16. A farmer purchased a horse for $\$225\frac{1}{2}$ and a cow for $\$135\frac{1}{2}$. He sold the horse for \$250 and the cow at a loss equal to the gain on the horse. What was the selling price of the cow?

17. A steamer traveled $480\frac{1}{4}$ miles the first day out from port. This was $18\frac{3}{4}$ miles more than it traveled the second day and $19\frac{1}{2}$ miles more than the third day. How far did it travel the second day? The third day?

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Fractions (Multiplication Problems)

1. Find the area of a floor $7\frac{5}{6}$ yd. long and $9\frac{3}{8}$ yd. wide.

2. At the rate of $9\frac{3}{8}$ mi. an hour, how far did a boy ride his bicycle in $2\frac{3}{8}$ hr.?

3. What is the cost of 36 bu. of wheat at $\$.76\frac{3}{4}$ a bushel?

4. How far does a train travel in 24 hr. at the rate of $38\frac{2}{3}$ mi. an hour?

5. If a tailor used $5\frac{3}{8}$ yd. of cloth for each of 18 suits of clothes, how much cloth did he use for all?

6. Find the yearly rent of a house at $\$66\frac{2}{3}$ a month.

7. When hay is selling for $\$10\frac{7}{8}$ a ton, how much must be paid for $15\frac{1}{2}$ tons?

8. An agent sold 16 books at $\$15\frac{2}{3}$ each and 24 books at $\$9\frac{3}{8}$ each. How much did he receive for all?

9. Find the area of a floor which is $5\frac{1}{2}$ yd. square.

10. Since there are $5\frac{1}{2}$ yd. in 1 rod, what is the length in yards of a fence which is $18\frac{2}{3}$ rd. long?

11. A man purchased a house for $5,286 and paid $\frac{3}{8}$ of the cost the first year, $\frac{5}{16}$ of the cost the second year and the remainder the third year. How much did he pay the third year?

12. An ocean steamer moved at an average rate of $15\frac{5}{8}$ miles an hour. How far did it travel in $168\frac{3}{4}$ hours?

13. A clerk sold $\frac{7}{8}$ of a roll of cloth containing 25 yd., at $\$2\frac{3}{4}$ a yd. How much did he receive for what he sold?

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14. There are $30\frac{1}{4}$ square yards in a square rod. How many square yards are in 2,000 square rods?

15. What number divided by $37\frac{1}{8}$ equals $29\frac{10}{11}$?

16. By walking at an average rate of $3\frac{3}{5}$ miles an hour for $8\frac{1}{2}$ hours per day, a man covered the distance between two cities in $6\frac{7}{12}$ days. How far apart were the cities?

17. Find the cost of excavating a cellar 27 ft. long, 18 ft. wide, and 7 feet deep, at $.24 a cubic yard.

Fractions (Division Problems)

1. A store keeper paid $\$32\frac{3}{8}$ for 18 crates of berries. What was the cost per crate?

2. How many suits of clothes each requiring $5\frac{5}{8}$ yd. of cloth can be cut from $102\frac{1}{8}$ yd. of cloth?

3. In a field containing $5\frac{3}{5}$ acres there were raised $102\frac{2}{5}$ bushels of corn. Find the average number of bushels raised on each acre.

4. A train moving at the rate of $21\frac{3}{16}$ miles an hour covered a distance of $508\frac{1}{2}$ mi. What length of time was required to cover this distance?

5. A revolving wheel covered a distance of $278\frac{1}{3}$ mi. Since it covered $18\frac{5}{6}$ feet in one revolution, how many revolutions did it make?

6. Find the number of square rods in 2,400 square yards of land ($30\frac{1}{4}$ square yards make 1 square rod).

7. Equal numbers of rugs containing $15\frac{3}{4}$ yards, $18\frac{2}{3}$ yards and $16\frac{5}{8}$ yards respectively were cut from 1,225 yards of carpet. How many rugs of each size were there?

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8. A man paid $2,480 for a farm which was $2\frac{2}{3}$ times the value of the barn which he built upon it. What was the value of the barn?

9. The circumference of a circle is approximately $3\frac{1}{7}$ times its diameter. Find the approximate diameter of a circular race track which is 528 ft. long.

10. Fifteen men owned equal shares in a business which yielded a profit of $\$2{,}307\frac{2}{3}$ during the month of January. What was each man's share of the profit?

11. How many sacks of flour at $\$.33\frac{1}{3}$ each wholesale, could a grocer buy with $\$8\frac{2}{3}$?

12. When flour is selling for $\$7\frac{1}{8}$ a barrel, what part of a barrel can be purchased with $\$2\frac{2}{3}$?

13. How many pounds of rice, at $6\frac{2}{3}$ cents a pound, can be bought with 60 cents?

14. A train covered a distance of $333\frac{1}{3}$ miles in $6\frac{1}{4}$ hours. What was the rate per hour? Per minute?

15. A boat moving at the rate of $13\frac{1}{3}$ miles an hour, traveled $166\frac{2}{3}$ miles. In what length of time did it cover this distance?

16. By what number must the dividend, $346\frac{2}{9}$, be divided to give a quotient of $74\frac{2}{3}$?

17. By what must $8\frac{3}{4}$ be multiplied to give a product of $24\frac{1}{2}$?

18. An agent bought a consignment of wheat for $528. He sold part of it at the same rate for $396. What part did he sell?

19. I paid $85 for $12\frac{1}{2}$ tons of hay. How many tons could I have purchased with $\$106\frac{1}{4}$?

20. How many barrels, each containing $31\frac{1}{2}$ gal., can be filled with $913\frac{1}{2}$ gal. of cider?

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Fractions (Miscellaneous Problems)

1. From a tract of land containing 220 acres there were made 3 farms each containing $18\frac{3}{8}$ acres, 4 farms each containing $15\frac{1}{8}$ acres and 7 farms each containing $12\frac{3}{4}$ acres. The land which remained unsold was used for a pasture. What was its size?

2. By working $9\frac{3}{8}$ hours a day for 18 days a man finished a piece of work. If he had worked $10\frac{1}{2}$ hours a day, in what length of time would he have completed it? If he had completed it in 20 days, how many hours a day would he have had to work?

3. A owns $\frac{2}{5}$ of a certain business, B owns $\frac{3}{8}$ of it, C owns $\frac{1}{12}$ of it. What part of the business belongs to D who owns the remainder of it?

4. A man left $\frac{1}{4}$ of his estate to his daughter, $\frac{3}{16}$ of it to each of two sons, and $\frac{2}{5}$ as much to his wife as to his daughter and sons. What was the wife's share?

5. A farmer sold $15\frac{2}{3}$ bu. of potatoes at \$.36 a bushel, and received in return 25 pounds of sugar at $\$.05\frac{1}{2}$ a pound and the remainder in cash. How much money did he receive?

6. Five loads of hay weighed as follows: $1\frac{2}{3}$ tons, $\frac{7}{8}$ ton, $1\frac{2}{5}$ tons, $1\frac{3}{8}$ tons, and $1\frac{1}{4}$ tons. Find the average weight of each load.

7. If $7\frac{2}{3}$ bushels of grapes make $12\frac{1}{4}$ gallons of wine, how many bushels will make 125 gallons of wine?

8. The juice of $4\frac{2}{3}$ bushels of apples made $12\frac{3}{5}$ gallons of vinegar. How many gallons did $30\frac{2}{3}$ bushels make at the same rate?

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9. Find the cost of 48 planks, each $7\frac{3}{8}$ feet in length, at $\$.09\frac{7}{8}$ a foot.

10. A piece of cloth contained $6\frac{1}{4}$ yards. From it were made a vest requiring $\frac{1}{2}$ of a yard, a coat requiring $1\frac{3}{4}$ yards and trousers requiring $1\frac{1}{4}$ yards. How much material was used for the overcoat which was made from the remainder of the goods?

11. A steamer ran between two ports which were 3,000 miles apart. After making an average speed of $387\frac{3}{8}$ miles a day for $4\frac{9}{10}$ days, what distance had it still to make?

12. A farm contained $124\frac{1}{2}$ acres of land. $\frac{3}{5}$ of it was sold for $\$3,275\frac{3}{8}$. What was the price per acre?

13. Two cities are $85\frac{1}{2}$ miles apart. One trolley leaves the first city and moves at the rate of $24\frac{1}{2}$ miles an hour. Another trolley leaves the second city and moves at the rate of $18\frac{1}{4}$ miles an hour. If they travel toward each other, in how many hours will they meet? How far does each travel before they meet?

14. A man owned $\frac{9}{16}$ of a business worth $4,500. What part of his share should he sell for $1,215?

15. A grocer purchased $28\frac{3}{4}$ bu. of potatoes at $.46 a bushel. He sold $\frac{3}{5}$ of them at a profit of $\$.15\frac{1}{2}$ a bushel and the rest at cost price. What did he receive for all the potatoes? What profit did he make?

16. A commission merchant purchased $36\frac{1}{2}$ bushels of apples at $.45 a bushel. $2\frac{1}{3}$ bu. decayed. He sold the remainder of the apples at a total gain of $5. What was the selling price per bushel?

17. A can do a piece of work in $10\frac{3}{8}$ days. B can work $\frac{4}{15}$ as fast as A. In what time can both complete the work by working together?

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18. Mary picked $7\frac{1}{4}$ boxes of berries in one hour and Frances $8\frac{1}{2}$ boxes. When Mary had picked $43\frac{1}{2}$ boxes, how many had both girls picked?

19. What part of a piece of work can a man do in $12\frac{1}{2}$ days, if he does $\frac{7}{15}$ of it in $8\frac{2}{3}$ days?

20. 9 men cleaned a certain amount of pavement in $24\frac{2}{3}$ days. How many men could do the same work in $18\frac{1}{2}$ days?

21. The sum of two numbers is $235\frac{3}{4}$, and their difference is $17\frac{1}{8}$. Find the two numbers.

22. A can do a piece of work in 9 days, B in 10 days, and C in 12 days. A works 3 days, B 3 days and C 2 days. In what time can A and B complete the work by working together?

Fractions (Problems Involving Three Types)

1. A sidewalk is 990 yards in length. This is $\frac{9}{16}$ of a mile. Find the number of feet in a mile.

2. A farm contained 340 acres of trees. The tree area of the farm was $\frac{17}{32}$ of a section of land. What is the size of a section of land?

3. Two towns are $42\frac{3}{4}$ miles apart. Henry rode $33\frac{1}{4}$ miles of this distance on his bicycle. What fraction of the distance did he still have to ride?

4. The selling price, $4,825.50, of a house and lot was a gain of $\frac{1}{3}$ of the cost. What was the cost?

5. The distance between two cities is $438\frac{5}{12}$ miles. A person traveled $\frac{4}{5}$ of the distance by water, $\frac{2}{3}$ of the remaining distance by rail, and the remainder of the distance by carriage. How far did he travel by carriage?

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6. A circular field has a diameter of 110 feet. This is $\frac{7}{22}$ of its circumference. What is the length of the circumference in yards?

7. An orchard yielded $47\frac{1}{2}$ bushels of pears. The owner sold $35\frac{5}{8}$ bushels to a merchant. What part of the pear crop did he sell to the merchant?

8. A man held $\frac{6}{7}$ of the shares of a business. He sold $\frac{3}{5}$ of his shares. The remainder of his shares were worth $465. What was the value of the entire business?

9. A business firm made a profit of $295.20 during January. This was $\frac{9}{16}$ of the profit made during the following month. The amount made during these two months was $\frac{4}{16}$ of the year's profits. What did the firm make during the year?

10. A real estate agent purchased two houses for $9,500. $\frac{2}{3}$ of the cost of one is equal to $\frac{3}{5}$ of the cost of the other. Find the cost of each?

11. A house cost $\frac{8}{5}$ as much as the lot upon which it was built. Both cost $4,485. Find the cost of each.

12. After selling $\frac{5}{8}$ of a piece of land, $215\frac{3}{4}$ acres remained. How much land was there before the sale?

13. A, B and C formed a partnership, A contributing $\frac{3}{8}$ of the money, B $\frac{2}{5}$ of it, and C the remainder. The total profits for the year were $4,260. What was each person's share?

14. A man earned $\$66\frac{2}{3}$ a month for a certain length of time. After paying his expenses, which amounted to $\frac{9}{16}$ of what he had earned, he had $350 left. How many months did he work?

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15. A butcher purchased live chickens weighing $35\frac{3}{4}$ pounds at $\$.08\frac{1}{2}$ a pound. He lost $\frac{3}{10}$ of their weight in dressing them. What did the dressed chickens cost per pound?

16. Frank earned $\$3\frac{3}{8}$ a day and Earl $\$4\frac{1}{2}$. Frank earned the same part of Earl's pay that Earl earned of William's. How much did William receive a day?

17. A father gave \$76 to his two sons. $\frac{3}{4}$ of the older son's money was equal to $\frac{5}{8}$ of the younger son's. How much did each receive?

18. A man left an estate of \$12,510. To his daughter he left $\frac{7}{12}$ as much as to his wife, and to his son $\frac{11}{16}$ as much as to his wife. What was each one's share?

19. $\frac{2}{7}$ of the number of cattle on one ranch equals $\frac{3}{4}$ of the number on another ranch. There are 1,102 cattle on both. How many are on each?

20. A and B worked together for $3\frac{3}{8}$ days on a piece of work which they can do in $6\frac{1}{3}$ days. A stopped working, and B completed the remainder of the work in $8\frac{1}{3}$ days. In how many days could each do the work alone?

21. A man purchased wheat for which he paid \$1,750. He sold $\frac{3}{8}$ of it at a gain of $\frac{1}{3}$ of what the $\frac{3}{8}$ cost, and the remainder at a gain of $\frac{4}{7}$ of what the $\frac{3}{8}$ cost. What was the selling price of the wheat?

22. A man sold $\frac{5}{6}$ of his interest in some property for \$15,000. If his share amounted to $\frac{2}{3}$ of the property, what part of the whole did he sell? What was the value of the property?

23. A's farm was $\frac{7}{9}$ as large as B's which contained 1323 A., and it was $\frac{3}{4}$ as large as C's. What was the size of C's farm?

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ALIQUOT PARTS OF A DOLLAR

1. State instantly the part of a dollar to which each of the following is equal:

a. 50 cents.
b. 20 cents.
c. $16\frac{2}{3}$ cents.
d. 10 cents.
e. $6\frac{1}{4}$ cents.
f. $33\frac{1}{3}$ cents.
g. 25 cents.
h. $12\frac{1}{2}$ cents.
i. $8\frac{1}{3}$ cents.
j. 5 cents.
k. 30 cents.
l. $37\frac{1}{2}$ cents.
m. $66\frac{2}{3}$ cents.
n. $62\frac{1}{2}$ cents.
o. 75 cents.
p. $87\frac{1}{2}$ cents.
q. 90 cents.
r. 40 cents.
s. 80 cents.
t. 60 cents.

2. State instantly the value of each of the following:

a. $\frac{3}{10}$ of a dollar.
b. $\frac{3}{8}$ of a dollar.
c. $\frac{2}{3}$ of a dollar.
d. $\frac{6}{10}$ of a dollar.
e. $\frac{5}{8}$ of a dollar.
f. $\frac{2}{3}$ of a dollar.
g. $\frac{7}{10}$ of a dollar.
h. $\frac{3}{4}$ of a dollar.
i. $\frac{3}{8}$ of a dollar.
j. $\frac{7}{8}$ of a dollar.
k. $\frac{4}{5}$ of a dollar.
l. $\frac{9}{10}$ of a dollar.
m. $\frac{1}{3}$ of a dollar.
n. $\frac{1}{2}$ of a dollar.
o. $\frac{1}{6}$ of a dollar.
p. $\frac{1}{8}$ of a dollar.
q. $\frac{1}{12}$ of a dollar.
r. $\frac{1}{20}$ of a dollar.

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Express, orally, the value of:

3. 16 yd. of lace at 12½ cents a yard.
4. 12 yd. of cloth at 16⅔ cents a yard.
5. 27 books at 33⅓ cents each.
6. 12 knives at 16⅔ cents each.
7. 15 yd. of oilcloth at 66⅔ cents a yard.
8. 32 balls at 6¼ cents each.
9. 24 kites at 8⅓ cents each.
10. 16 pairs gloves at 87½ cents a pair.
11. ⅞ yd. of velvet at $1.00 a yd.
12. ¾ doz. buttons at $1.00 a doz.
13. ⅝ of a gross of paper at $1.00 a gross.
14. ½ yd. of silk at $1.00 a yd.
15. ¼ bu. of potatoes at $1.00 a bushel.
16. ⅔ bu. of wheat at $1.00 a bu.
17. $\frac{3}{10}$ yd. of cloth at $1.00 a yd.
18. ⅛ bu. of peaches at $1.00 a bu.
19. ⅜ doz. of thimbles at $1.00 a doz.
20. ⅜ bu. of spinach at $1.00 a bu.
21. ⅔ yd. of cloth at $1.50 a yard.
22. 96 yd. matting at 62½ cents a yard.
23. 24 bu. grain at 87½ cents a bushel.
24. ⅛ yd. of satin at $2.25 a yard.
25. ⅝ doz. eggs at 36 cents a dozen.

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DECIMALS

Notation and Numeration of Decimals

Read aloud and also write in words:

1. .1, .3, .6, .9.
2. .01, .09, .10, .14, .73.
3. .001, .010, .047, .200, .706, .540.
4. .0001, .0025, .0080, .0300, .0406.
5. .0970, .2000, .4736, .6050, .7001.
6. .00001, .00013, .00126, .00900, .03000.
7. .07365, .09002, .01030, .80040, .70006.
8. .000001, .000500, .002070, .042007, .012403.
9. .069050, .821000, .280030, .130004, .200000.
10. 3.04, 72.108, 68.3004, 114.00027, 19.027416.
11. 300.006, .306, .210, 200.010.
12. .400, .00004, .000310, 300.000010, .0000200.

Read aloud and also write in words as dollars and decimals of a dollar:

13. \$.04, \$.50, \$.75, \$.08½, \$.10¼.
14. \$1.27, \$5.07, \$14.00, \$46.32, \$116.23½.
15. \$1.43⅛, \$4.75⅞, \$7.69⅜, \$19.54⅝.

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Write in figures:

1. Thirty-five hundredths.
2. Ninety-four thousandths.
3. Sixteen tenths.
4. One hundred two ten-thousandths.
5. Fifty hundred-thousandths.
6. Seven hundred thousandths.
7. Four hundred ten thousandths.
8. Seven millionths.
9. Two hundred and ten millionths.
10. Two hundred ten millionths.
11. Two hundred ten-millionths.
12. Two hundred and ten ten-millionths.

Write in figures as dollars and cents:

13. Three and twenty-five hundredths dollars.
14. One hundred and eight hundredths dollars.
15. Two thousand and fifty hundredths dollars.
16. Fifty-seven and fifty-seven hundredths dollars.
17. Thirty-four and twelve and one-eighth hundredths dollars.
18. Fifty and nineteen and five-eighths hundredths dollars.
19. One hundred and thirty-four and three-eighths hundredths dollars.
20. Two hundred four and seventy-two and seven-eighths hundredths dollars.

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Reduction of Decimal Fractions

Express as common fractions and reduce to lowest terms:

1. .8.
2. .09.
3. .52.
4. .095.
5. .0008.
6. .165.
7. .0095.
8. .66⅔.
9. .84½.
10. .37½.
11. .00048.
12. .06075.
13. .000007.
14. 1.12½.
15. 2.16⅔.
16. 2.50.
17. .0⅜.
18. .001⅛.
19. $\frac{.4}{100}$.
20. $\frac{.01}{10}$.

Express as decimals:

1. ⅓.
2. ¾.
3. $\frac{1}{12}$.
4. $\frac{1}{16}$.
5. $\frac{1}{80}$.
6. $\frac{1}{28}$.
7. $\frac{12}{15}$.
8. $\frac{7}{8}$.
9. $\frac{18}{16}$.
10. $\frac{.4}{100}$.
11. $\frac{10}{12}$.
12. $3\frac{17}{20}$.
13. $\frac{8}{9}$.
14. $2\frac{21}{30}$.
15. $\frac{\frac{2}{3}}{100}$.
16. $\frac{\frac{7}{8}}{100}$.
17. $\frac{\frac{1}{2}}{10}$.
18. $\frac{1\frac{2}{5}}{100}$.
19. $\frac{\frac{2}{3}}{\frac{4}{5}}$.
20. $\frac{\frac{3}{4}}{\frac{2}{5}}$.

Addition of Decimals (Abstract Examples)

Add:

1.	2.	3.	4.	5.
3.84	2.98	3.55	2.09	4.76
2.69	7.83	2.48	4.76	2.99
1.75	1.67	1.79	1.58	1.78
4.86	6.26	4.67	3.89	5.64
5.07	.79	2.98	5.97	9.89

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6.	7.	8.	9.	10.
23.45	44.44	45.67	56.78	98.76
34.56	55.55	45.67	56.78	98.76
45.67	66.66	45.67	56.78	98.76
56.78	77.77	45.67	56.78	98.76
67.89	88.88	77.77	88.88	99.99

11.	12.	13.	14.	15.
44.44	46.75	57.86	67.98	76.98
55.55	77.64	86.75	98.67	56.79
66.66	65.56	75.58	67.78	78.98
77.77	40.46	68.57	79.89	89.48
88.88	65.74	70.58	69.78	38.79
99.99	76.76	87.86	76.66	97.68

16.	17.	18.	19.	20.
123.45	398.47	734.28	986.74	987.65
234.56	3.56	59.67	769.52	876.54
345.67	48.79	802.59	588.31	765.43
456.78	506.28	.37	975.60	654.32
567.89	1.97	57.68	729.15	543.21
678.91	24.33	497.13	897.46	432.10
789.12	179.85	84.94	657.97	321.06

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21.	22.	23.	24.	25.	26.
48.37	80.40	98.34	41.93	84.68	21.68
51.92	83.94	85.67	48.15	63.82	13.57
71.85	85.67	89.19	73.58	56.91	46.29
39.25	92.56	91.24	24.34	21.83	59.87
39.87	79.34	93.95	38.16	58.79	62.75
79.81	83.14	83.04	39.90	16.85	77.88
84.26	47.39	48.96	90.09	87.58	49.67
51.55	68.68	15.43	98.34	91.94	83.59

27.	28.	29.	30.	31.
78.90	2678.67	14.57	364.24	1324.76
9584.64	652.53	374.60	98764.42	965.21
6967.42	1253.52	4.63	135.65	10010.10
174.91	927.83	73.64	2345.78	565.84
29.73	3576.29	19.68	157.87	927.46
667.64	750.34	8.57	50.56	463.53
9860.71	9234.12	58.47	6221.13	457.24
7865.23	121.15	13.29	3462.14	7596.13
9408.23	7654.98	15.87	1589.87	968.76
174.56	1234.56	46.32	347.00	4632.18

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Subtraction of Decimals (Abstract Examples)

Subtract:

1. 35.42 — 5.47.
2. 43.51 — 7.62.
3. 27.63 — 8.79.
4. 31.04 — 1.95.
5. 25.73 — 7.74.
6. 73.06 — 4.07.
7. 28.55 — 8.96.
8. 17.26 — 8.27.
9. 32.45 — 4.46.
10. 27.74 — 7.85.
11. 16.53 — 15.59.
12. 43.78 — 24.09.
13. 45.26 — 35.17.
14. 39.45 — 29.67.
15. 72.91 — 52.08.
16. 30.37 — 19.38.
17. 41.12 — 29.94.
18. 37.2 — 36.37.
19. 50.04 — 49.96.
20. 27.3 — 17.22.
21. 71.15 — 50.96.
22. 60.1 — 50.17.
23. 42.31 — 23.98.
24. 50.78 — 38.99.
25. 63.54 — 43.49.
26. 34.28 — 29.609.
27. 43.946 — 32.857.
28. 31.054 — 19.076.
29. 70.062 — 21.997.
30. 53.11 — 51.909.
31. 20.308 — 19.199.
32. 40.7 — 29.891.
33. 21.034 — 19.197.
34. 40.021 — 31.965.
35. 53. — 25.419.
36. 40.002 — 39.897.
37. 32.1045 — 23.9476.
38. 45.261 — 44.7825.
39. 37.0101 — 19.9978.
40. 54.0012 — 27.6403.
41. 30.0548 — 23.5499.
42. 20.02 — 19.9188.
43. 30.0003 — 29.0914.
44. 21.7 — 17.7819.
45. 52.0107 — 26.0598.
46. 31.125 — 13.7486.
47. 20.04 — 11.9498.
48. 3.111 — 2.99889.
49. 2.88891 — 1.97994.
50. .790103 — .297648.

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Multiplication of Decimals (Abstract Examples)

1. $2.4 \times 37.$
2. $.35 \times 4.6.$
3. $.72 \times 9.4.$
4. $5.8 \times 30.5.$
5. $.74 \times 7.25.$
6. $2.6 \times 38.59.$
7. $90 \times .768.$
8. $1.7 \times 456.$
9. $.33 \times 207.$
10. $.04 \times 873.6.$
11. $7.5 \times .348.$
12. $.026 \times 40.7.$
13. $.75 \times 365.2.$
14. $.207 \times 80.4.$
15. $54 \times 7.32.$
16. $3.09 \times .471.$
17. $4.27 \times .046.$
18. $.282 \times 5.77.$
19. $49 \times 2.046.$
20. $.17 \times 38.05.$
21. $.314 \times .456.$
22. $.1476 \times 3.82.$
23. $28.5 \times .1049.$
24. $.374 \times .289.$
25. $.099 \times .4378.$
26. $3.79 \times .826.$
27. $.188 \times 7.89.$
28. $.69 \times 9.49.$
29. $2.78 \times 7.86.$
30. $.395 \times 4.67.$
31. $4.86 \times 79.5.$
32. $.77 \times 3.597.$
33. $.28 \times .0798.$
34. $.536 \times .467.$
35. $8.7 \times .652.$
36. $.299 \times 74.9.$
37. $.48 \times 9.78.$
38. $19.5 \times 36.7.$
39. $74.6 \times .0775.$
40. $.85 \times .889.$
41. $.457 \times .972.$
42. $.299 \times .086.$
43. $53.8 \times .744.$
44. $.79 \times .0908.$
45. $8.5 \times .6579.$
46. $9.9 \times .0989.$
47. $5.04 \times .0076.$
48. $.438 \times .6675.$
49. $2.87 \times 84.39.$
50. $.597 \times .0989.$

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Multiplication of Decimals (Concrete Examples)

Find the cost of the following purchases:

1. 48,600 shingles @ $2.75 per M.
2. 24,700 laths @ $.27 per C.
3. 136 gal. alcohol @ $2.48 per gal.
4. 66,750 bricks @ $10.75 per M.
5. 475 boxes cigars @ $15.75 per box.
6. 1,468 gal. oil @ $.07½ per gal.
7. 2,308 T. of coal @ $5.37½ per T.
8. 25,468 bu. wheat @ $.88¾ per bu.
9. 985 bottles wine @ $1.78 per bottle.
10. 275 bbl. meat @ $15.47 per bbl.

Find the area of the following fields:

1. 65.4 yd. long and 52 yd. wide.
2. 54.6 yd. long and 86 yd. wide.
3. 78 yd. long and 47.8 yd. wide.
4. 31.6 yd. long and 47.5 yd. wide.
5. 96 yd. long and 86.3 yd. wide.
6. 24.6 rd. long and 37.2 rd. wide.
7. 15.4 rd. long and 17.6 rd. wide.
8. 21.8 rd. long and 49.2 rd. wide.
9. 13.85 rd. long and 16.7 rd. wide.
10. 24.52 rd. long and 17.48 rd. wide.

The English pound is worth $4.8665 of United States money. Find the value of:

1. 24 pounds.
2. 76 pounds.
3. 85 pounds.

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Division of Decimals (Abstract Examples)

1. .612 ÷ .72.
2. .72 ÷ .75.
3. 11.439 ÷ .31.
4. 52.26 ÷ 7.8.
5. 20.88 ÷ 87.
6. 471.42 ÷ .97.
7. 46.956 ÷ 54.6.
8. 24.412 ÷ .34.
9. 56.444 ÷ 27.4.
10. 1379.2 ÷ 8.62.
11. 82.848 ÷ .096.
12. .025359 ÷ .0321.
13. .01886 ÷ .023.
14. .19248 ÷ 4.01.
15. 2002.65 ÷ 42.25.
16. 1811.52 ÷ .4896.
17. 1469.40 ÷ 1860.
18. 178.895 ÷ .185.
19. 4676.25 ÷ .87.
20. 6208.61 ÷ 7859.
21. .893628 ÷ .2892.
22. 9040.95 ÷ .362.
23. 3431.25 ÷ 2745.
24. 4984 ÷ .089.
25. 15584.73 ÷ .0987.
26. 11.8260 ÷ 91.25.
27. 105410 ÷ 103.75.
28. 1834.308 ÷ 15.06.
29. 984.375 ÷ 437.5.
30. 3427.38 ÷ .54.
31. 103.8510 ÷ .66.
32. 2.451504 ÷ .48.
33. .2875758 ÷ .0079.
34. 522.3567 ÷ 87.
35. 71.7600 ÷ 9.6.
36. .4519536 ÷ .056.
37. .89545692 ÷ .9876.
38. 56.113056 ÷ 80.07.
39. 5.2204731 ÷ .7589.
40. .4800000 ÷ .9375.
41. 117.31392 ÷ .6789.
42. 3.0291840 ÷ 8.765.
43. .77526952 ÷ .9608.
44. 36.877848 ÷ 6.789.
45. 592.59204 ÷ 76.98.
46. .56320000 ÷ 6.875.
47. .24768012 ÷ 65.42.
48. 7610.92392 ÷ .09507.
49. .607807200 ÷ .8096.
50. .136819250 ÷ .07346.

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Division of Decimals (Concrete Examples)

Find the cost of 1 unit of each kind, when

1. 916 bbl. of flour cost $4,122.
2. 888 bbl. of apples cost $3108.
3. 67.2 acres of land cost $6,316.8.
4. 785 yd. of carpet cost $659.40.
5. 892 bu. of grain cost $481.68.
6. 790 bu. of wheat cost $505.60.
7. 625 lb. of rice cost $51.875.
8. 87.2 ft. of land cost $4,621.60.
9. 834 lb. of sugar cost $52.542.
10. 723 yd. of carpet cost $520.56.

The circumference of a circle is 3.1416 times its diameter. Find the diameters of circles having the following circumferences:

11. 164 ft.
12. 426 ft.
13. 14.3 ft.
14. 1,676 rd.
15. 1,200 rd.

There are 30.25 sq. yd. in 1 sq. rd.

Find the number of square rods in:

16. 608.9325 sq. yd.
17. 9815.125 sq. yd.
18. 1385.7525 sq. yd.
19. 231.6545 sq. yd.
20. 26616.975 sq. yd.

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There are 2150.42 cu. in. in 1 bu. Find the number of bushels in

21. 10106.974 cu. in.
22. 1784.8486 cu. in.
23. 17.20336 cu. in.
24. 7676.9994 cu. in.
25. 967689 cu. in.
26. 8,171.596 cu. in.
27. 120,423.52 cu. in.
28. 32,041.258 cu. in.
29. 4,408.361 cu. in.
30. 178,484.86 cu. in.

There are 39.37 inches in 1 meter. How many meters in

31. 2992.12 in.?
32. 2125.98 in.?
33. 1141.73 in.?
34. 1496.06 in.?
35. 2755.9 in.?
36. 18.1102 in.?
37. 40.5511 in.?
38. 295.275 in.?
39. 1.02362 in.?
40. 350.393 in.?

The English pound is worth about $4.87. To how many pounds is each of the following amounts equal?

41. $277.59.
42. $175.32.
43. $141.23.
44. $233.76.
45. $423.69.
46. $185.06.
47. $608.75.
48. $1,003.22.
49. $3.6525.
50. $32.629.

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Problems in Decimals and United States Money

1. A clerk who was taking an inventory measured the following lengths of cloth: 26.5 yd., 19.875 yd., 8.125 yd., 15 yd., 24.375 yd., 7.5 yd., 13.75 yd., 23.875 yd., and 17 yd. Find the total amount of cloth which he measured.

2. From a roll of cloth containing 50 yd., a clerk sold six pieces containing 3.5 yd., 4.875 yd., 9.25 yd., 12.125 yd., 7.375 yd., and 8 yd. respectively. How much cloth remained unsold?

3. A firm paid $2.75 per day to each of 38 employees. What was the amount of money paid in one week?

4. A grocer paid $58.20 for a quantity of flour which he purchased at $4.85 per barrel. How many barrels did he purchase?

5. What is the total area of tracts of land containing 127.46 sq. mi., 93.87 sq. mi., 38.57 sq. mi., 345.06 sq. mi., 82.19 sq. mi., 78 sq. mi., 149.34 sq. mi., 25.56 sq. mi., and 47.02 sq. mi. respectively?

6. From a tract of land containing 1000 sq. mi., 309.06 sq. mi. were sold. How much land remained?

7. There are 5280 ft. in a mile. How many feet are in 37.25 mi.?

8. A certain strip of land having a frontage of 600 ft. was divided into lots each 37.5 ft. wide. How many lots were made from the strip of land?

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9. Find the total length of molding needed for rooms 19.75 ft. long and 17.38 ft. wide, 26.32 ft. long and 18.68 ft. wide, and 15.46 ft. long and 9.35 ft. wide respectively.

10. A meter is 39.37 inches long. Find the difference in length between one meter and one yard.

11. There are 2150.42 cu. in. in 1 bushel. Find the capacity in cubic inches of a bin which holds 47.38 bu.

12. The length of a fence inclosing a farm is 2673 yards. How many rods long is the fence, a rod being equal to 5.5 yards?

13. What is the total length of the various branches of a railroad which have the following lengths: 2836.41 mi., 879.36 mi., 1068.29 mi., 437.08 mi., 299.4 mi., and 178.63 mi.?

14. State the amount of change which should be received from $50.00 given in payment for goods amounting to $1.18, $2.50, $3.69, $4.05, and $ .78.

15. An agent sold 36 machines at $39.75 each. How much did he receive for them?

16. A dealer sold fruit jars for $1.53 per dozen or for $ .15 apiece. How much per jar was saved by buying them by the dozen?

17. The sales for one week in the various departments of a store were as follows: millinery $467.52, dry goods $1942.73, clothing $507.98, men's furnishings $239.64, groceries $437.53. What was the amount of the week's sales?

18. A farm produced 1,832.75 bu. of wheat one year and 2,012.32 bu. the following year. Find the difference between the two yields of wheat.

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19. There are 30.25 square yards in a square rod. Find the number of square yards in 46.37 sq. rd.

20. I paid $6.30 for 18 rolls of wall paper. What would 24 rolls have cost at the same rate?

21. Find the number of inches in 36.5 meters each of which contains 39.37 in.

22. Find the cost of bricks per thousand when $2266.26 is paid for 176,500 bricks.

23. A woman made the following purchases: blankets $4.79, cloth $8.32, shoes $4.98, umbrella $3.75, gloves $1.49, towels $ .75, coat $18.50. Find the amount of her bill.

24. An automobilist traveled 2,340.56 mi. the first month, 794.37 fewer miles the second month, and 839.09 fewer miles the third month than the second. Find the distance covered during the three months.

25. What was the profit made on 48 boxes of oranges bought at $2.75 a box and sold at $3.50 a box?

26. $4984 was paid for wheat at $ .89 a bushel. How many bushels were purchased?

27. A man deposited the following amounts in a bank: $73.49, $48.67, $29.55, $104.37, $91.76, $115,38. He then drew out $175.58. How much more was it necessary for him to deposit in order to have an account of $500?

28. Two boats, starting from the same point, moved in opposite directions, one at the rate of 12.346 miles an hour and the other at the rate of 16.015 miles an hour. How far had each moved at the end of 9.48 hours? How far apart were the two boats?

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29. The capacity of a bin is 96,768.9 cu. in. Since 2150.42 cu. in. make one bushel, what is the capacity of the bin in bushels?

30. A traveling man rode 179.43 mi. Monday, 286.09 mi. Tuesday, 98.47 mi. Wednesday, 135.26 mi. Thursday, 203.78 mi. Friday, and 79.83 mi. Saturday. How many miles did he ride in all?

31. An elevator contained 4,379.85 bu. of grain. 849.37 bu. were taken from it at one time and 74.88 fewer bushels at another time. How much grain remained in the elevator?

32. A merchant bought 48 yards of carpet at $1.35 per yard. He sold .75 of it for .96 of the entire cost. What did he receive per yard for what he sold?

33. If 18 lb. of rice can be bought for $1.62, how much will 26 lb. cost at the same rate?

34. A storekeeper sold goods for $1,352.25 which was a gain of $407.38. How much did they cost him?

35. On a field of 15.75 A., the average production of potatoes was 58.5 bushels to an acre. How much was received for the entire crop which was sold at $ .48 a bushel?

36. The area of a farm is 2268.75 sq. yd. Since 30.25 sq. yd. make one square rod, what is the area of the farm in square rods?

37. There were three clerks at the dressgoods counter in a store. The sales of the first amounted to $237.63; of the second, to $19.79 less than the first; and of the third to $8.65 less than the second. Find the difference between the sales of the first and of the third clerks.

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38. The unit of German money is the mark which is worth 23.8 cents in United States money. Find the value of 79 marks.

39. A meter is 39.37 in. long. Find to two decimal places the number of yards in a meter.

40. A man deposited money in a bank on the first day of January. The amounts of interest which he received for the first three quarters of the year were $237.43, $268.75, and $307.88 respectively. How much more did he receive at the end of the second quarter than at the end of the first? At the end of the third quarter than at the end of the first? At the end of the third quarter than at the end of the second?

41. The unit of French money is the franc which is worth 19.3 cents in United States money. Find the value of 68 francs.

42. The baseball team of one city had an average of .713 and of another city an average of .554. How much higher was the average of the first than that of the second? How much higher was it necessary for each team to be in order to have a perfect record?

43. How much per lb. is lost by buying coffee at $.35 per lb. when a 6-lb. can can be bought for $2.00?

44. A man is plowing a field of 12.76 acres. He plows 1.8 A. the first day, 1.9 A. the second day and 2.1 A. the third day. What was his average day's work? At this average how many more days would it take to finish plowing the field?

45. The average length of three boards is 14.7 ft. One board is 12.35 ft. long, another is 15.72 ft. long. What is the length of the third board?

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BILLS

Find the totals of the following bills. Each column represents a separate bill.

1.

T. R. Walker — **To J. M. Graham, Dr.**

Feb. 2, 1913.

	a	*b*	*c*	*d*	*e*	*f*
45 lbs. almonds..@..	$.10	$.12¼	$.15	$.10½	$.17½	$.11¼
36 lbs. Brazil nuts @..	.15	.13½	.17¼	.14	.15½	.16½
48 lbs. walnuts ..@..	.18	.15	.17½	.16¼	.16	.17
35 lbs. pecans ...@..	.11½	.13½	.12	.15	.10	.11
248 lbs. candy ....@..	.18	.15	.24	.19	.10	.17

2.

E. F. Whitcomb — **To S. M. Dignen, Dr.**

Apr. 7, 1913.

	a	*b*	*c*	*d*	*e*	*f*
75 lbs. tea .....@..	$.24	$.32	$.28	$.25	$.26	$.27
18 lbs. cloves ....@..	.17	.15	.18	.14	.19	.16
19 lbs. nutmeg ..@..	.48	.53	.64	.50½	.55	.47
48 lbs. coffee ....@..	.24	.27	.22½	.23	.28	.26
23 lbs. pepper ...@..	.13	.12	.10	.11	.11½	.14
150 lbs. sugar ....@..	.05	.05½	.05¼	.04	.04½	.04¼

3.

B. R. Sanford — **To G. H. Hoffman, Dr.**

Sept. 4, 1913.

	a	*b*	*c*	*d*	*e*	*f*
18 bbl. apples .....@	$1.95	$2.35	$2.50	$3.25	$2.75	$2.25
9 boxes oranges....@	2.50	3.75	2.75	3.50	3.25	2.85
12 bunches bananas @	1.85	2.15	1.98	2.12	2.00	1.65
15 boxes lemons ...@	3.64	2.78	3.25	2.75	3.10	2.95
12 doz. pineapples ..@	2.68	3.00	2.75	2.26	3.15	2.65
8 crates berries....@	7.50	5.25	6.28	7.14	5.84	6.50
10 crates raspberries @	4.95	7.25	6.50	7.00	6.00	4.90

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4.

T. C. Henty — **To M. T. Mevins, Dr.**
Dec. 15, 1912.

	a	*b*	*c*	*d*	*e*	*f*
435 yds. carpet....@..	$ .72	$ .66	$ .48	$ .75	$1.25	$ .98
186 yds. carpet....@..	1.35	1.25	1.18	.98	1.15	1.37
89 yds. carpet....@..	2.40	1.84	1.67	1.35	2.24	3.15
384 yds. carpet....@..	.67	.58	.74	.59	.36	.75
205 yds. carpet....@..	1.16	.79	1.35	2.16	1.05	2.00
75 yds. carpet....@..	.66	1.74	2.15	.84	.75	.95
103 yds. carpet....@..	.74	.82	.96	.55	.67	1.05
210 yds. carpet....@..	1.10	1.35	2.24	1.36	1.88	.76

5.

G. R. Nickol — **To T. A. Strode, Dr.**
Jan. 14, 1913.

	a	*b*	*c*	*d*	*e*	*f*
8 sets furniture..@..	$65.40	$32.75	$84.66	$95.38	$86.42	$38.45
15 dining tables..@..	18.62	24.40	17.05	68.00	25.50	16.25
24 chairs .....@..	2.85	7.00	6.35	3.50	4.45	3.55
10 sideboards ....@..	48.68	72.00	35.28	20.75	18.34	17.88
268 yds. matting..@..	.18	.15	.14	.17	.23	.16
12 rugs .....@..	4.98	5.00	6.38	4.05	7.75	6.50
148 yds. carpet....@..	1.95	.82	.75	1.25	1.50	2.00
75 yds. border....@..	.75	1.18	.68	2.25	1.70	2.15

6.

E. C. Thompson — **To F. G. Newton, Dr.**
Mar. 3, 1913.

	a	*b*	*c*	*d*	*e*	*f*
83 bbls. flour.....@..	$4.68	$5.25	$4.85	$5.15	$4.76	$5.24
375 lbs. coffee.....@..	.28	.26	.24	.27	.25	.29
246 lbs. tea.....@..	.32	.30	.28	.34	.33	.27
76 gals. molasses..@..	.28	.35	.29	.33	.37	.36
38 lbs. raisins.....@..	.18	.24	.23	.19	.20	.17
45 lbs. currants...@..	.12	.13	.15	.11	.10	.14
24 cans corn.....@..	.14	.12	.13	.17	.16	.15
24 cans peas.....@..	.13	.15	.14	.16	.11	.12
36 pkgs. oatmeal..@..	.10	.09	.11	.12	.13	.08
25 lbs. tapioca....@..	.07	.08	.09	.06½	.07½	.08¼

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MEASUREMENTS

Linear Measure

Reduce:

1. 129 yd. to inches.
2. 640 rd. to feet.
3. 57 mi. 65 rd. to feet.
4. 1 mi. to rods and then directly to feet.
5. .25 mi. to inches.
6. 56700 in. to yards.
7. 1050 ft. to rods and lower units.
8. 1320 ft. directly to rods.
9. 88000 yd. to miles.
10. 7 yd. 2 ft. 8 in. to inches.
11. 3 mi. 47 rd. 3 yd. to yards.
12. $\frac{1}{8}$ mi. to each of the lower units.
13. 5427 ft. to rods, yards, etc.
14. 7205 yd. to miles and rods.
15. 3520 in. to a fraction of a mile.
16. 2 mi. 37 rd. to inches.
17. 12,350 in. to rd., yd., etc.
18. 258 yd. to rods and yards.
19. 13468 in. to rd., yd., etc.
20. 14 mi., 3 rd., 2 in. to inches.
21. $\frac{3}{4}$ mi. to each of the lower units.
22. 4206 ft. to rd., ft., etc.
23. 3300 in. to miles.
24. 46 mi., 15 rd. to feet.
25. 14,862 in. to rods, yards, etc.

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26. Telegraph poles were placed 165 feet apart. How many were needed for 2 miles of wire?

27. The circumference of a race track is $\frac{1}{2}$ of a mile in length. How many yards would a person travel in going around it 4 times?

28. In a city the house numbers are placed 20 feet apart, with the odd numbers on one side of the street and the even numbers on the other. John's house number is 264. What part of a mile does he walk in going from his home to the beginning of the street?

29. A rectangular field is 550 yards long and 330 yards wide. At $.75 a rod what would it cost to erect a fence around the field?

30. A boy made a 200-yard dash. What part of a mile was that distance?

Surface Measure

Reduce:

1. 48 sq. yd. to square inches.
2. 27 sq. yd. 5 sq. ft. to square inches.
3. 148 sq. rd. to square feet.
4. 1 sq. mi. to each of the smaller square units.
5. 4 A. 38 sq. rd. to square feet.
6. 9072 sq. in. to square yards.
7. 32670 sq. ft. to square rods.
8. 121000 sq. yd. to acres.
9. 6067 sq. yd. to square rods and square yards.
10. 34848160 sq. ft. to square miles.
11. 15 sq. rd. to square feet.
12. 64 A. 13 sq. rd. to square yards.

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13. 115,072 sq. in. to square rods, square feet, etc.
14. 47 sq. mi. 15 A. to square yards.
15. 32,467 sq. in. to square yards, square feet, etc.
16. 27,006 sq. yd. to acres, square rods, etc.
17. 7,359 sq. yd. to acres, square rods, etc.
18. $\frac{3}{4}$ sq. mi. to square feet.
19. 35 sq. mi. 15 A. to square yards.
20. 219,438 sq. in. to square rods.

Cubic Measure

Reduce:

1. 98 cu. ft. to cubic inches.
2. 36 cu. yd. 18 cu. ft. to cubic feet.
3. 57 cu. yd. 938 cu. in. to cubic inches.
4. 10 cd. 10 cu. ft. to cubic feet.
5. 47 cu. yd. 21 cu. ft. to cubic feet.
6. 15552 cu. in. to cubic feet.
7. 1166400 cu. in. to cubic yards.
8. 43,265 cu. in. to cubic feet.
9. 2580 cu. ft. to cords.
10. 3870 cu. ft. to cubic yards.
11. 2,439,571 cu. in. to cubic yards.
12. 500,000 cu. in. to cords.
13. 25 cd. 8 cu. ft. to cubic feet.
14. 834,562 cu. in. to cubic yards.
15. 56,872 cu. ft. to perches, each containing 24$\frac{3}{4}$ cu. ft.
16. 3,568 cords 15 cu. ft. to cubic inches.

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17. 346 cu. yd. to cubic inches.

18. 354,205 cu. in. to cubic yards.

19. 45 cu. yd. 13 cu. ft. to cubic inches.

20. 1,627,538 cu. in. to cords.

Dry Measure

Reduce:

1. 48 qt. 1 pt. to pints.

2. 17 pk. 6 qt. to quarts.

3. 1 bu. to each of the smaller units.

4. 85¾ bu. to quarts.

5. 124¾ pk. to the next smaller unit.

6. 76 pt. to larger units.

7. 164 qt. to larger units.

8. 156 pk. to larger units.

9. 6 bu. 3 pk. 2 qt. 1 pt. to pints.

10. 16 bu. 3 pk. 1 pt. to pints.

11. 736,846 qt. to bushels.

12. 29 bu. 7 qt. to pints.

13. 20,000 pt. to pecks.

14. 1,532 pt. to bushels.

15. 4,238 qt. to bushels.

16. 76 bu. 3 pk. 7 qt. to pints.

17. A bushel contains 2,150.42 cu. in. How many bushels of oats can be put in a bin containing 860,168 cu. in.?

18. Find the weight, at 60 lb. to the bushel, of the potatoes that can be placed in a bin having a capacity of 1,935,378 cu. in.

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19. A bushel contains 2,150.42 cu. in. Find the capacity of a dry quart.

20. Find the capacity in cubic feet of a bin which holds 200 bushels of grain, there being 2,150.42 cu. in. in one bushel.

21. How deep must a bin be that is 16 ft. by 7 ft. in order to hold 420 bu. of 2,150 cu. in. each?

22. A fruit dealer sold 8 bu. of berries at 6 cents a pint. How much did he receive for them?

23. How many boxes each holding 2 pk. 4 qt., are needed to hold 80 bu. of peaches?

24. A farmer shipped 275 baskets of tomatoes, each of which contained 1 pk. 4 qt. How many bushels did he ship?

25. $10.00 was paid for strawberries at $.08 a quart. How many bushels were bought?

Liquid Measure

Reduce:

1. 76 pt. 3 gi. to gills.
2. 85 qt. 2 gi. to gills.
3. 49½ gal. to pints.
4. 35 bbl. to gal. (31½ gal. = 1 bbl.).
5. 247 hhd. to gal. (63 gal. = 1 hhd.).
6. 356 gi. to larger units.
7. 1,037 pt. to larger units.
8. 3,425 gal. to hhd. (63 gal. = 1 hhd.).
9. 1,708 gal. to bbl. (31½ gal. = 1 bbl.).
10. 24 gal. 2 qt. 1 pt. to pints.
11. 4,500 gills to gallons.

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12. 15 gal. 1 pt. 3 gills to gills.

13. 680 pt. to gallons.

14. 57 qt. 1 pt. 2 gills to gills.

15. 25,000 pt. to barrels.

16. 42,250 pt. to hogsheads.

17. 28 hhd. 27 gal. to quarts.

18. 10,000 gills to gallons.

19. 40 gal. 3 qt. 3 gills to gills.

20. 80 gal. 1 pt. to pints.

21. A milk dealer sold 4 gallons of milk at $.07 a quart. How much did he receive for it?

22. Find the profit which was made by buying 50 gallons of molasses at $.05½ a pint and selling it at $.12 a quart.

23. Find the cost of 85 gal. of vinegar at $.02 a pint.

24. How many cubic inches of water are contained in a tank having a capacity of 50 gallons?

25. A gallon contains 231 cubic inches. Find the capacity of a liquid quart.

Measure of Weight

1. Reduce 35 lb. 9 oz. to ounces.

2. Reduce 15,000 lb. to tons.

3. Reduce 75 T. 500 lb. to pounds.

4. What is the weight of 450 bu. of wheat at 60 lb. to a bushel?

5. What is the weight of 700 bu. of oats at 32 lb. to a bushel?

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6. Find the weight of 300 bu. of shelled corn, if one bushel weighs 56 lb.

7. How many tons are there in a cargo of 20,000 bu. of wheat, the weight of one bushel being 60 lb.?

8. At $12.75 a ton, how much will 50,000 lb. of hay cost?

9. In New York State 1 bu. of barley weighs 48 lb.; 1 bu. of buckwheat 48 lb.; and 1 bu. of potatoes 60 lb. Find the total weight of a shipment of 150 bu. of barley, 240 bu. of buckwheat, and 175 bu. of potatoes.

10. Find the weight of 75 cubic feet of water, the weight of one cubic foot being 62½ lb.

Reduce:

11. 3 tons 18 cwt. 78 lb. to pounds.

12. 2 tons 13 cwt. 10 oz. to ounces.

13. 17 cwt. 65 lb. 9 oz. to ounces.

14. 134,719 lb. to tons.

15. 32,846 oz. to hundredweights.

16. 201,325 lb. to tons.

17. 4,100,000 oz. to tons.

18. 153,207 oz. to hundredweights.

19. 35 cwt. 15 oz. to ounces.

20. 8 tons 12 cwt. 3 lb. 9 oz. to ounces.

21. A factory shipped 2,500 boxes, each containing 24 one-pound packages of cereal. What was the total weight of the cereal in tons?

22. Find the total weight of beef required by a regiment of 1,000 men for 24 days, if each man is allowed 1 lb. 2 oz. daily.

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Measure of Time

Reduce:

1. 26 hr. 18 min. 14 sec. to seconds.
2. 5 da. 15 hr. 35 min. to minutes.
3. 15 wk. 18 hr. to minutes.
4. 608.400 sec. to larger units.
5. 3,153,600 min. to years of 365 da. each.
6. 126,227,704 sec. to days.
7. 3 yr. 15 da. to days.
8. 1 yr. 8 mo. to hours.
9. 1,467,385 min. to years of 360 da. each.
10. 2,743,562 sec. to weeks.
11. 325,482 hr. to months.
12. 11 mo. 22 da. 13 hr. to minutes.
13. 2 yr. 7 mo. 18 da. to months.
14. 3 yr. 5 mo. 27 da. to months.
15. How many days are there from January 16 to July 2 in a common year?
16. A man went to Europe July 7 and returned home January 4. How many days was he away?
17. How many days are in 20 years?
18. Name the first leap year after 1913.
19. A person left New York for a city 2,860 miles distant. If he traveled at the rate of 550 miles in 24 hours, in what length of time would he complete his journey?
20. Find the length of time required to fill a reservoir which has a capacity of 100,000,000 gallons if 20 gal. are admitted per second.

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Measure of Quantity

1. How many eggs are 25 doz. 6 eggs?

2. How many pens are 25 gross?

3. In $8\frac{3}{4}$ gross there are how many pencils?

4. What was the age of a man who lived $3\frac{1}{2}$ score years?

5. Find the cost of 15 gross of knives at $2.75 a dozen.

6. At $14.40 a gross, what was paid for 12 books?

7. A dealer purchased a gross of mantles for $6.48, and sold them at the rate of 3 for 25 cents. Find his gain.

8. 100 gross of hooks were sold for $.04 a dozen at a loss of $12. What was the cost per dozen?

Reduce:

9. 50,000 sheets of paper to reams.

10. 83 reams 15 quires 10 sheets to sheets.

11. 42 gross 3 dozen to ones.

12. 4,754 ones to gross.

13. 13,542 sheets of paper to reams.

14. 43,572 ones to gross.

15. 75 gross 4 dozen to ones.

16. 13,527 ones to gross.

17. 14 reams 8 quires 9 sheets to sheets.

18. 48 gross 6 ones to ones.

19. A box of stationery contained 2 quires 2 sheets of one kind of paper and 3 quires 3 sheets of another kind. How many sheets of paper were there?

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20. At $.12\frac{1}{2}$ a quire, how much will 28 quires of paper cost?

21. Find the difference in cost between purchasing paper by the dozen at $\frac{3}{4}$ ct. a sheet and purchasing 2 quires for 32 ct.

22. A paper-dealer gained $52\frac{1}{2}$ by selling 50 bundles of paper at the rate of $.00\frac{1}{2}$ a sheet. What was the cost per bundle?

Circular Measure

Reduce:

1. 48° 32′ to minutes.
2. 29° 17′ 34″ to seconds.
3. 1,800″ to larger units.
4. 50,000″ to larger units.
5. 37,560″ to degrees.
6. 16,742′ to degrees.
7. 27° 14′ 29″ to seconds.
8. 24,025″ to degrees.
9. 45° 15′ 44″ to seconds.
10. 3,572′ to degrees.
11. $\frac{3}{4}$ of a circumference to minutes.
12. 48′ 29″ to seconds.
13. 15,000′ to part of a circumference.
14. How many degrees in $\frac{5}{6}$ of a circumference?
15. Find the number of seconds in $\frac{1}{2}$ of a circumference.
16. How many seconds are in the equator (360°)?

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17. There are $23\frac{1}{2}°$ from the arctic circle to the north pole. Find the number of seconds.

18. Since there are $23\frac{1}{2}°$ from the equator to the Tropic of Capricorn, how many minutes from the Tropic of Capricorn to the south pole?

English Money

1. Reduce £5 to pence.

2. Express 50 s. as pence.

3. Reduce 1,500 s. to pounds.

4. Change 2,400 d. to pounds.

5. Regarding the pound as equal to $4.87, express the value of £250 in United States money.

6. How many pounds should a person receive in exchange for $1,071.40 when a pound is worth $4.87?

7. A person was required to pay a 10% duty on goods which cost him £400. How much duty did he pay in U. S. money?

Express as pence:

8. £15.
9. £25 16 s.
10. £18 6 s. 4 d.
11. £20 10 s. 5 d.

Express as shillings:

12. £24.
13. £126 15 s.
14. 240 d.
15. 1,440 d.

16. Express in United States money the value of (*a*) £15 (£1 = $4.8665); (*b*) £24; (*c*) £35; (*d*) £125.

17. To how many pounds ($4.8665) are the following amounts equal— (*a*) $29.199; (*b*) $87.597; (*c*) $330.922; (*d*) $515.849?

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French Money

1. For how many francs could a person exchange $96.50, when one franc is worth $.193?

2. Valuing the 5 franc piece at $1.00, how many such pieces could one exchange for $2.00?

3. Express 3,460 centimes as francs.

4. Find the value in U. S. money of 2,000 fr.

5. Express as francs and decimals: (*a*) 345 c; (*b*) 432 c; (*c*) 1,000 c; (*d*) 1,468 c.

6. Express in United States money the value of (*a*) 17 fr. (1 fr. = $.193); (*b*) 23 fr.; (*c*) 79 fr.; (*d*) 237 fr.

7. To how many francs are the following amounts equal? (*a*) $4.825; (*b*) $8.299; (*c*) $16.791; (*d*) $59.058.

German Money

1. Express 8,670 pf. as marks.

2. The U. S. quarter dollar is worth how much more than the German mark?

3. $119 is equal in value to how many marks worth $.238?

4. For how many dollars could a person exchange 3,000 marks?

5. Express as marks and decimals: (*a*) 650 pf.; (*b*) 775 pf.; (*c*) 1,350 pf.; (*d*) 8,750 pf.

6. Express in U. S. money the value of (*a*) 23 M. (1 M. = $.238); (*b*) 71 M.; (*c*) 215 M.; (*d*) 834 M.

7. Express as marks ($.238); (*a*) $4.522; (*b*) $14.994; (*c*) $34.51; (*d*) $88.536.

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Denominate Numbers—(Addition)

1. A dressmaker made three dresses for which she used 6 yd. 9 in., 8 yd. 12 in., and 7 yd. 27 in. of cloth respectively. Find the total amount of cloth used.

2. A woman purchased two pieces of meat, one of which weighed 4 lb. 12 oz. and the other 6 lb. 8 oz. How much did both weigh?

3. Find the total length of fence needed to enclose a field the sides of which are 10 rd. 8 ft., 6 rd. 4 ft., 12 rd. 12 ft., and 8 rd. 3 ft.

4. A steamship crossed the Atlantic Ocean in 10 da. 15 hr. and returned in 9 da. 12 hr. How long did it require for both trips?

Denominate Numbers—(Subtraction)

1. A field is 38 rd. 7 ft. long and 19 rd. 13 ft. wide. The length of the field is how much more than the width?

2. A man is 43 yr. 7 mo. old. His son is 29 yr. 8 mo. younger. Find the son's age.

3. From a bin containing 124 bu. 2 pk. of wheat, 75 bu. 4 qt. were taken. How much wheat remained in the bin?

4. The area of one floor is 4 sq. rd. 15 sq. yd. and that of another is 3 sq. rd. 24 sq. yd. Find the difference between the two areas.

5. One ocean liner crossed the Atlantic Ocean in 8 da. 50 min. 14 sec., and another in 9 da. 24 min. 10 sec. How much longer was the second one in crossing than the first one?

6. Find the difference in longitude between New York City which is 73° 58′ 25.5″ W. and Albany which is 73° 44′ 48″ W.

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Denominate Numbers—(Multiplication)

1. A floor is covered with 6 strips of carpet, each 4 yd. 2 ft. 8 in. in length. Find the amount of carpet on the floor.

2. A wheel has a circumference of 8 ft. 4 in. How far does it travel in making 62 revolutions?

3. Find the perimeter of a field which is 17 rd. 2 yd. long and 14 rd. 2 ft. wide.

4. A lady made 6 aprons, each of which required 2 yd. 9 in. of cloth. How much cloth was used?

5. An engineer made 6 trips a week, each of which required 8 hr. 45 min. How much time did all require?

Denominate Numbers—(Division)

1. A train travels 18 mi. in 22 min. 15 sec. How long does it take to go a mile?

2. How many planks each 8 ft. 9 in. in length will be required for a sidewalk which is 34 ft. long and 4 boards in width?

3. A brick is 8 in. by 4 in. by 2 in. How many bricks will be needed for a wall 35 ft. by 6 ft. by 1 ft., making no allowance for mortar?

4. A tract of land having a frontage of 277 ft. 4 in. was cut into lots each 34 ft. 8 in. wide. How many lots were there?

5. A roll of matting 65 ft. in length was cut into strips each 5 ft. 18 in. in length. How many strips were there?

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Areas of Rectangles

Find the areas of rectangles of the following dimensions:

	Length	*Width*
1.	18 in.	$12\frac{1}{2}$ in.
2.	24 in.	36 in.
3.	39 ft.	65 ft.
4.	$48\frac{3}{8}$ ft.	72 ft.
5.	66 rd.	57 rd.
6.	38 yd.	99 yd.
7.	44 rd.	$72\frac{3}{4}$ rd.
8.	76 rd.	39.4 rd.
9.	15 yd. 2 ft.	23 yd. 1 ft.
10.	27.4 mi.	53.8 mi.

Find the areas of squares having the following lengths:

11.	$16\frac{1}{2}$ in.	14.	24.6 rd.
12.	$37\frac{3}{4}$ ft.	15.	2.08 mi.
13.	15.7 ft.	16.	50.2 rd.

Find the lengths of these rectangles:

	Area	*Width*		*Area*	*Width*
16.	3,300 sq. ft.	50 ft.	21.	1,898 sq. rd.	39 rd.
17.	3,995 sq. ft.	47 ft.	22.	3,682 sq .rd.	56 rd.
18.	118.75 sq. ft.	95 ft.	23.	2,499 sq. rd.	$29\frac{3}{8}$ rd.
19.	6,726 sq. ft.	59 ft.	24.	2,877.54 sq. rd.	39.8 rd.
20.	7,380 sq. ft.	82 ft.	25.	5,815.06 sq. rd.	60.7 rd.

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Find the areas of the following surfaces:

26. A floor, 28 ft. by 16 ft.

27. A yard, 34 ft. by 135 ft.

28. A roof, each side of which is 25 ft. by 48 ft.

29. A farm 35 rd. by 68 rd.

30. The four walls of a room 24 ft. by 18 ft. by 8 ft.

31. A sidewalk 35 ft. by 6 ft.

32. Four windows, each 6 ft. by $3\frac{1}{2}$ ft.

33. The walls and ceiling of a room, 18 ft. by 12 ft. by 8 ft.

34. A rug 15 ft. by 12 ft.

35. Find the area of the walls of a room 15 ft. by 12 ft. by 9 ft., deducting the areas of 2 windows each 6 ft. by 3 ft. and 2 doors, each $6\frac{1}{2}$ ft. by 3 ft.

36. How many acres are in a rectangular field 378 rd. long and 76 rd. wide?

37. A pasture which is 54 rd. long contains $8\frac{1}{10}$ A. What is its width?

38. At 18 cents a square yard what will be the cost of painting the walls of a kitchen 15 ft. long by 12 ft. wide by 9 ft. 4 in. high?

39. Allowing 1,000 shingles for 120 square feet, find how many thousand shingles will cover a roof each side of which is $19\frac{1}{3}$ yards long and 8 yards wide.

40. A man buys an acre of land in the form of a rectangle with 66 feet fronting the street. How deep must the lot be?

41. A man owns a field 330 ft. long and 132 ft. wide. (*a*) How many acres are there in the field? (*b*) Into how many lots 33 ft. front by 132 ft. deep can it be divided? (*c*) Draw a diagram to show the division of this field into lots.

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42. A roll of wall paper 8 yd. long and 18 in. wide costs 25 cents. What will be the cost of paper for the four walls of a room 30 ft. by 27 ft. by 9 ft., no allowance being made for openings? Work by square measure.

43. Find the cost, at $.45 a roll, of papering the walls of a room 16½ ft. long, 15 ft. wide, and 12 ft. high, making no allowances for openings?

44. What will it cost, at $.25 per roll, to paper the walls of a room 18 ft. by 15 ft. by 11 ft., allowing 10 sq. yards for openings, if each roll is 8 yd. long and 18 in. wide?

45. The length of a square field is 9 rd. 3 yd. Find its area in square feet.

46. How many acres are in a field 368 yards long and 235 yards wide? (Use cancellation.)

47. A farm contains an orchard 40 rods long and 37 rods wide. Find the number of acres in the orchard. What is it worth at $136 per acre? (Use cancellation.)

48. How many square feet are in a roof 18 yards long and 5½ yards wide on each side?

49. A parlor floor is 20 feet long and 18 feet wide. It is covered with a rug 17 feet long and 14 feet wide. Find the area of the floor space which is not covered by the rug.

50. The length of a square pasture is 48 rods. Find its area in acres. How many yards of fence are needed to enclose the pasture?

51. The length of a pasture lot is 3 times its width, and the fence around the lot measures 224 rods. Find the area of the pasture in square yards.

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Areas of Triangles

Find the areas of the following triangles:

	Base	*Altitude*		*Base*	*Altitude*
1.	17 ft.	10 ft.	6.	$67\frac{2}{3}$ ft.	48 ft.
2.	30 ft.	18 ft.	7.	$139\frac{3}{8}$ ft.	75 ft.
3.	29 ft.	14 ft.	8.	$82\frac{3}{7}$ ft.	42 ft.
4.	87 ft.	65 ft.	9.	70.4 ft.	$19\frac{3}{4}$ ft.
5.	108 ft.	96 ft.	10.	57.3 ft.	$26\frac{3}{5}$ ft.

Find the bases of the following triangles:

	Area	*Altitude*		*Area*	*Altitude*
1.	1,360 sq. ft.	16 ft.	6.	26,290 sq. ft.	55 ft.
2.	1,290 sq. ft.	15 ft.	7.	34,394 sq. ft.	58 ft.
3.	1,748 sq. ft.	19 ft.	8.	38,808 sq. ft.	63 ft.
4.	3,103 sq. ft.	29 ft.	9.	47,212 sq. ft.	74 ft.
5.	10,865 sq. ft.	41 ft.	10.	76,160 sq. ft.	85 ft.

Find the altitudes of the following triangles:

	Area	*Base*		*Area*	*Base*
1.	1,066 sq. in.	41 in.	6.	6,048 sq. ft.	84 ft.
2.	1,632 sq. in.	48 in.	7.	13,185 sq. ft.	$146\frac{1}{2}$ ft.
3.	2,231 sq. in.	$48\frac{1}{2}$ in.	8.	14,852 sq. ft.	158 ft.
4.	2,862 sq. in.	53 in.	9.	36,084 sq. ft.	291 ft.
5.	6,630 sq. in.	$97\frac{1}{2}$ in.	10.	46,368 sq. ft.	322 ft.

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Areas of Parallelograms (Not Rectangles)

1. Find the area of a parallelogram whose base is 87 ft. and altitude is 60 ft.

2. What is the altitude of a parallelogram having an area of 3,995 sq. ft. and a base of 85 ft.

3. A parallelogram has an area of 660 sq. ft. and an altitude of 22 ft. Find the base.

4. A field in the form of a parallelogram is 30 rd. long and has an altitude of 20 yd. 1 ft. How many square rods in the area of the field?

5. A pasture in the form of a parallelogram contains 3 A. 92 sq. rd. It is 26 rd. long. Find its width.

6. How many square feet are in a field in the form of a parallelogram, if each side measures 950 ft. and the perpendicular between the opposite sides is 750 ft.?

7. A corner lot is in the form of a parallelogram. Its parallel sides are 135 ft. long and its altitude is 45 ft. How many square rods are in its area? (Use cancellation.)

Areas of Trapezoids

1. Find the area of a trapezoid with parallel sides of 24 ft. and 36 ft., and an altitude of 9 ft.

2. A trapezoid has an area of 936 sq. ft. Its parallel sides are 36 ft. and 68 ft. Find the altitude.

3. The parallel sides of a field in the form of a trapezoid are 52 rd. and 98 rd. in length, and lie 30 rd. apart. Find the area of the field in square rods.

4. A garden plot in the shape of a trapezoid is 150 ft. wide on one side, 80 ft. wide on the parallel side, and has an area of 6,900 sq. ft. How deep is the plot?

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5. A farm in the shape of a trapezoid has an altitude of 21 rd. and an area of 1,176 sq. rd. If one of its parallel sides is 40 rd. long, what is the length of the other side?

6. A farm in the shape of a trapezoid had an altitude 60 rd. long and contained $43\frac{1}{3}$ acres. One of its parallel sides was 105 rd. long. What was the length of the other side?

Measurement of Circles

The circumference of a circle is approximately $3\frac{1}{7}$ times the diameter; or, more accurately, 3.1416 times the diameter.

Find the approximate circumferences of circles having the following diameters:

1. 378 in.
2. 294 in.
3. 504 in.
4. 315 in.
5. 252 in.
6. 189 ft.
7. 105 ft.
8. 168 ft.
9. 147 ft.
10. 231 ft.

Find the more accurate circumferences of the circles having the following diameters:

1. $11\frac{1}{4}$ ft.
2. $7\frac{3}{4}$ ft.
3. $6\frac{1}{4}$ ft.
4. 4 ft.
5. $17\frac{1}{2}$ ft.
6. $14\frac{1}{2}$ ft.
7. $9\frac{1}{2}$ ft.
8. 12 ft.
9. 10 ft.
10. $7\frac{1}{2}$ ft.

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Find the more accurate circumferences of the circles having the following radii:

1. 7 ft.
2. 9 ft.
3. $5\frac{1}{2}$ ft.
4. $6\frac{1}{2}$ ft.
5. $4\frac{1}{2}$ ft.
6. $8\frac{1}{4}$ ft.
7. $6\frac{3}{4}$ ft.
8. $5\frac{1}{4}$ ft.
9. $7\frac{3}{4}$ ft.
10. $4\frac{3}{8}$ ft.

Find the radii of circles having the following circumferences:

1. 42.9 ft.
2. 32.8 ft.
3. 159 ft.
4. 213 ft.
5. 335 ft.
6. 38 rd.
7. 426 rd.
8. 176.5 rd.
9. 300 rd.
10. 450 rd.

1. Find the area of a circle having a diameter of 7.957 feet and a circumference of 25 feet.

2. A circular flower bed is 12 feet in diameter. What is its area?

3. A horse was tied to a stake with a rope 26 feet long. What was the area of the grass plot on which it could graze?

4. A man was sprinkling a lawn with a hose from which the water could be thrown 37 feet. How many square feet of lawn could he water from one position?

5. A circular table has a radius of $3\frac{1}{2}$ ft. The circumference of the table spread which is upon it is 3 inches inside the edge of the table. Find the number of square feet in the table spread.

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6. A circular plot has a radius of 27 yards. How many square rods does it contain?

7. The race track in a certain armory had a circumference of $\frac{1}{4}$ mile. What was the number of square feet in the floor space enclosed by the circumference?

Surfaces of Prisms or Cylinders

1. A right prism 60 in. high, has a triangular base with sides 20 in., 21 in., and 29 in. long. Find the number of square feet in the entire surface.

2. Find the area of the lateral surface of a quadrangular prism 10 ft. by 18 ft., and 48 ft. long.

3. What is the area in square inches of the entire surface of a rectangular prism 36 in. by 39 in. and 90 in. long?

4. A rectangular prism has a base 3 ft. square. Find the area of the entire surface, the height being 6 ft.

5. Find the entire surface of a right prism 67 in. high, the sides of whose triangular base are 20 in., 15 in., and 25 in.

6. What is the area of the lateral surface of a cylindrical tank 25 ft. high and having a radius of 5 ft.?

7. A man painted the convex surfaces of 8 cylinders each of which had a diameter of 11 ft. and a height of 25 ft. How many square feet did he paint?

8. Find the entire surface of a cylinder having a radius of 21 in. and a depth of 90 in.

9. What is the area of both the ends and the curved surface of a cylindrical tank 128 ft. high, having a diameter of 96 ft.?

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Surfaces of Spheres

1. A sphere has a diameter of 10 ft. Find the area of its surface.

2. The globe used in a school room had a radius of 9 in. What was the area of its surface in square inches?

3. Find the surface in square inches of a sphere which has a circumference of 200 in.

4. Find the cost, at $.72 a square foot, of gilding a ball which has a diameter of 5 feet.

5. What is the length of the diameter of a sphere which has a surface of 13 sq. ft. 91½ sq. in.?

Measures of Volume and Capacity

Find the volumes of the following:

1. A rectangular solid 27 in. by 15 in. by 8 in.

2. A cube 12 inches on a side.

3. A cellar 38 ft. by 25 ft. by 6 ft. What will it cost to excavate at $.35 a cubic yard?

4. A wall 68 ft. long, 7 ft. high, and 1½ ft. thick.

5. The earth removed from a cellar 35 ft. by 28 ft. by 6 ft.

6. Ten loads of ice, each 6 ft. by 4 ft. by 5 ft.

7. A stone wall 138 ft. long, 6 ft. high and 1½ ft. wide.

8. The masonry in the walls of a cellar 54 ft. by 27 ft. by 7 ft., the walls being 1½ ft. thick.

9. The ice in an ice house 175 ft. long, 48 ft. wide and 12 ft. high, half filled with ice.

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Find the capacity of the following:

10. A cistern 6 ft. square, 12 ft. deep, and $\frac{3}{4}$ full.

11. A reservoir $\frac{3}{4}$ full, 154 yd. by 32 yd., by 12 ft. deep.

12. An aquarium 27 in. by 12 in. by 10 in.

13. A school room $10\frac{1}{2}$ yd. by 7 yd. and 4 yd. high.

14. Find the number of cubic feet of masonry in the front wall of a school building 48 ft. wide, 42 ft. high, and $1\frac{1}{2}$ ft. thick, allowing 432 cu. ft. for openings.

15. Marble weighs 2.7 times as much as water, and a cubic foot of water weighs $62\frac{1}{2}$ lb. Find the weight of a block of marble 7 ft. by 6 ft. by 4 ft.

16. The volume of a rectangular solid 4 ft. 6 in. long and 2 ft. 8 in. wide is 39 cu. ft. Find its height.

17. There were 2,304 cu. ft. of earth removed in excavating a cellar 6 ft. deep. Find the area of the cellar floor.

18. A farmer had a pile of wood 160 ft. long, 12 ft. wide, and 10 ft. high. How many cords of wood in the pile?

19. Workmen excavated a cellar 35 ft. by 48 ft. by $6\frac{1}{2}$ ft. How many cu. ft. of earth were removed? Rain filled the cellar to a depth of 18 in. How many gallons of water were in the cellar?

20. A metal tank holds 1,156 gal. of water. It is 4 ft. wide and 3 ft. 6 in. deep. Find its length.

21. To what depth will 240 gallons fill a vat 11 feet deep and 7 feet in diameter?

22. A cistern is 5 ft. deep, 4 ft. long and 3 ft. wide. About how many gallons does it contain?

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23. A grain bin which is 8 ft. long and 5 ft. wide, has a depth of 4 ft. Find its capacity in bushels.

24. A brick building is 45 ft. long, 33 ft. wide, 22 ft. high and has walls 1 ft. 6 in. thick. It contains 6 windows each 3 ft. by 7 ft., and 3 doors each 4 ft. by 9 ft. Find the cost of the bricks at $4.50 per thousand, allowing 21 bricks to a cubic foot and deducting for the openings.

25. Find the cost, at $8.50 a perch of $24\frac{3}{4}$ cu. ft., of the stone for the cellar walls of a house 38 ft. by 26 ft., the walls being 6 ft. high and $1\frac{1}{2}$ ft. thick.

26. How many gallons are in a cistern 7 feet by 4 feet and filled to a depth of 3 feet?

27. How deep must a tank be that is 16 feet by 7 feet in order to hold 2,764.8 gallons (231 cu. in. = 1 gal.)?

28. Find the cost at $7.50 per thousand of the brick required for the four walls of a house 30 ft. long, 24 ft. wide, 18 ft. high, and 1 ft. thick, allowing 21 bricks to the cubic foot and $\frac{1}{10}$ for openings.

29. A bin is 30 ft. by 15 ft. by 10 ft. How many bushels of wheat will it contain?

30. The inside measurements of a cellar wall $\frac{1}{2}$ yd. thick are 30 ft. by 21 ft. by 9 ft. How many cubic yards of masonry are in the walls making no allowance for openings?

31. The interior of a rectangular tank is $2\frac{1}{2}$ ft. by 3 ft. by 5 ft. In how many minutes will this tank be filled by a pipe that admits 18 quarts of water a minute?

32. Find the cost, at $11 per M, of building a brick wall 38 ft. by 7 ft. by $1\frac{1}{2}$ ft. thick, containing a gate 10 ft. by 7 ft. Allow 22 bricks for each cubic foot.

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33. At $7.29 per cubic yard, how much must be paid for building the walls of a cellar 44 ft. long, 38 ft. wide, if the walls are 8 ft. high and 2 ft. thick? (Double the corners in estimating the work.)

34. How many cubic feet of air are there in a school room 34 ft. by 16 ft. by 15 ft.?

35. Find the height of a block of marble in the form of a rectangular solid which contains 35 cubic feet and is 4 ft. 8 in. long and 3 ft. wide.

36. An ice box in a dairy was 4 ft. 3 in. high and contained 183 cu. ft. 792 cu. in. of ice when filled. Find the area of the floor.

37. A vat is 5 ft. by $2\frac{1}{2}$ ft. by 2 ft. How many gallons of water does it contain when filled?

38. How many bushels of malt does a wagon box hold if it is 10 ft. long, $3\frac{1}{2}$ ft. wide and $2\frac{1}{2}$ ft. deep?

Volumes of Cylinders

1. Find the solid contents of a cylinder whose diameter is 3 ft. and height 5 ft.

2. What is the volume of a cylinder 18.8496 in. in circumference and 16 in. high?

3. A granite column is 18 ft. high, and its base has a radius of $3\frac{1}{2}$ ft. What is its value at $\$6\frac{2}{3}$ a cubic foot?

4. Find the contents of a cylindric vessel whose diameter is 8 in. and whose depth is 1 foot.

5. A cylindric cistern 6 ft. deep is 7 ft. in diameter. How many gallons will it hold?

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6. A hollow cylinder is 8 ft. long and 5 ft. in diameter inside. Find its contents, also the cost of painting the inside surface at 9 cents a square yard.

7. The circumference of a certain tank is 33 ft. and its depth is 11 ft. How many barrels of oil will it hold?

8. How many cubic inches of water will it take to fill a pipe the area of the cross section of which is $3\frac{1}{4}$ sq. in. and the length 2 ft. 3 in.?

Volumes of Pyramids

1. Find the volume of a pyramid having a base 3 ft. square and an altitude of 5 ft.

2. The base of a pyramid is a right triangle having sides 27 in., 36 in., and 45 in. The height is 16 ft. What is the volume in cu. ft.?

3. How high is a pyramid which has a base 33 yd. square and a volume of 18,150 cu. yd.?

4. What is the length of the square base of a pyramid having an altitude of 18 ft. and 1,176 cu. ft. of contents?

5. The volume of a pyramid is 351 cu. ft. The altitude is 13 ft. Find the area of the base.

Volumes of Cones

1. Find the volume of a cone whose base is 7 ft. in diameter, and whose altitude is 18 ft.

2. A cone-shaped funnel has a diameter of 3 in. at the open end and is 5 in. deep to the vertex. How much water will it hold when closed at the bottom?

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3. A cornucopia which is conical in shape has a diameter of 6 in. across the opening and an altitude of 16 in. Give its capacity in cubic inches.

4. The base of a cone is 5 ft. in diameter and its volume is 196.35 cu. ft. Find the altitude.

5. The upper part of a church spire is in the form of a cone. It occupies 424.116 cu. ft. and has an altitude of 20 ft. Find the diameter.

6. A cone has a volume of 1767.15 cu. in. and a diameter of 15 ft. Find its altitude.

Volumes of Spheres

1. Find the volume of a sphere having a radius of 10 ft.

2. A globe has a diameter of 36 inches. How many cubic feet in its contents?

3. The inside measurement of the diameter of a glass globe is 15 in. How many gallons will it hold?

4. Find the diameter of a globe whose volume is 65,450 cu. in.

5. The volume of a globe is 33510.4 cu. in. Find the radius.

Board Measure

1. How many feet, board measure, are in an inch board, 18 ft. long and 8 in. wide?

2. Find the number of feet, board measure, in 18 planks $1\frac{3}{4}$ in. thick, 12 ft. long, and 14 in. wide.

3. Find the board measurement of 18 joists, 15 ft. long, 4 in. wide and 3 in. thick.

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4. How many board feet are in 16 boards $\frac{7}{8}$ in. thick, 16 ft. long and 9 in. wide?

5. Find the contents of a tapering board 1 in. thick, 16 ft. long, 15 in. wide at one end and 10 in. at the other.

6. Find the cost, at $14 a 1,000 feet, board measure, of 6 pieces of timber, each 24 ft. long, 10 in. wide, and 8 in. thick.

7. Find the cost of the following bill of lumber:

7 pieces 12′ × 10″ × 2″ at $16.50 a 1,000 feet.
12 pieces 16′ × 6″ × 4″ at $17.00 a 1,000 feet.
32 pieces 18′ × 12″ × 1″ at $20.75 a 1,000 feet.

8. Find the number of feet in the following bill of lumber:

8 pieces 3″ × 4″ 7 ft. long.
12 pieces 2″ × 4″ 9 ft. long.
8 pieces 12″ × 2″ 16 ft. long.
4 pieces 12″ × 1″ 20 ft. long.
7 pieces 8″ × 10″ 30 ft. long.

Carpeting

1. How many yards of carpet 1 yd. wide are needed for a room 20 ft. long and 18 ft. wide, if the strips run crosswise?

2. How many yards of carpet $\frac{3}{4}$ yd. wide will be required for a floor 21 ft. long and 18 ft. wide, if the strips run lengthwise and $\frac{1}{8}$ yd. on each strip is allowed for matching?

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3. A room is 12 ft. by 10 ft. Find the cost of covering the floor with carpet 1 yd. wide at $1.20 per yard, if the breadths run lengthwise.

4. At 65 cents a yard, what will it cost to cover a kitchen floor 14 ft. by 12 ft. with oilcloth 1 yd. wide, if the strips are laid crosswise and there is no waste in matching?

5. How many yards will it require to carpet a room 15 ft. long and 12 ft. wide with carpet 1 yd. wide, if the strips run crosswise and $\frac{1}{8}$ of a yard is allowed for matching on each strip except the first?

6. Find the cost, at $1.50 per yd., of carpeting a square room, 12 ft. long, with carpet $\frac{3}{4}$ yd. wide.

7. A room is 16 ft. long and 12 ft. wide. Find the cost of carpeting it at $1.25 per yd. with carpet $\frac{3}{4}$ yd. wide, laid crosswise.

8. A carpet, 1 yd. wide, was laid on a floor 46 ft. by 42 ft. Find the cost, at $1.50 a yard, if the strips were laid crosswise, and there was an allowance of 6 in. on each strip for matching.

9. A carpet, $\frac{3}{4}$ yd. wide, was laid lengthwise on a floor 17 ft. by 14 ft. How many yards of carpet were used?

10. A bedroom is 12 ft. by 8 ft. Matting 1 yd. in width was laid lengthwise on the floor. Find the cost of the matting at $.30 per yd.

11. If carpet, $\frac{3}{4}$ yd. wide, was laid lengthwise on a floor 21 ft. 6 in. long and 16 ft. 4 in. wide, how much did it cost at $.60 per yd.?

12. If carpet, $\frac{3}{4}$ yd. wide is laid crosswise on a floor 18 ft. long and 15 ft. wide, how much will it cost at $1.25 a yard?

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13. A room is 22 ft. by 18 ft. How much more carpet $\frac{3}{4}$ yd. wide is needed to lay the carpet crosswise than to lay it lengthwise, if an allowance of 6 in. for matching is made on all the strips except the first?

14. Carpet, 1 yd. wide, is laid crosswise on a floor 11 ft. long and 10 ft. wide. If an allowance of $\frac{1}{4}$ yd. on each strip is made for matching, what is the cost at $1.25 per yard?

15. At $1.25 per yd., what will it cost to carpet a floor 27 ft. by 18 ft. with carpet $\frac{3}{4}$ yd. wide, the strips running crosswise?

16. Find the cost at $.95 a yard, of carpeting a floor 18 ft. by 15 ft. with carpet 1 yd. wide, the strips running crosswise, allowing $\frac{1}{8}$ yd. on each strip for matching.

17. A carpet, 24 ft. long and 18 ft. wide was made of strips 30 in. wide, running lengthwise. An allowance of $\frac{1}{8}$ yd. on all the strips except the first was made for matching. A border 18 in. in width was placed around the carpet. Find the total cost, if $1.10 a yard was paid for the carpet and $.85 a yard for the border.

Plastering, Painting, etc.

1. A room is 45 ft. by 25 ft. by 12 ft. Find the number of square yards of plastering in the walls and ceiling, allowing 200 square feet for doors and windows.

2. Find the cost of plastering the walls and ceiling of a room 14 ft. long, 10 ft. wide and 9 ft. high, allowing for 2 doors, each 3 ft. by 7 ft., and 3 windows each 2 ft. 8 in. by 6 ft., at 32 cents a sq. yd. Make a diagram of this room.

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3. At 27 cents a square yard, what will be the cost of painting the walls of a kitchen 15 ft. long by 12 ft. wide by 9 ft. 4 in. high?

4. A garden 145 ft. long and 120 ft. wide is inclosed by a tight board fence 6 feet high. Find the cost, at 8 cts. a square yard, of painting both sides of the fence.

5. Find the cost, at $2.80 per M., of laths for the walls and ceiling of a room 20 ft. by 18 ft. and 9 ft. high, if 1,000 laths cover 70 square yards.

6. Of a flight of 8 steps, each step is 18 inches wide, 1 foot high and 6 feet long. Find the cost, at 9 cts. a square yard, of painting the steps.

7. Find the labor cost, at $1.30 per thousand, of shingling a roof having a ridge-pole 35 ft. long and rafters 23 ft. long, the exposed surface of each shingle being 20 sq. in.

8. At $.68 a bundle for laths and the labor of putting them on, how much will it cost to lath the walls and ceilings of 4 schoolrooms, each 30 ft. by 21 ft., the ceiling being 15 ft. above the baseboard, allowing 800 square feet for all the openings? Each bundle covers 6 sq. yd. of surface.

9. At $1.20 a bundle (250 shingles), how much will it cost to shingle 2,000 sq. ft. of roof, allowing 4 in. of the width and $4\frac{1}{2}$ inches of the length of the shingles to be exposed?

10. Find the cost, at $8 per M., of the bricks used in laying a walk 48 ft. by 4 ft., the exposed surface of each brick being 8 in. by 2 in.

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11. At $2\frac{1}{2}$ cents a square yard, find the cost of kalsomining two ceilings, one 16 ft. by 12 ft., and the other 19 ft. by 16 ft.

12. What will it cost for the shingles of a roof, the ridge-pole of which is 50 ft. long and the rafters 25 ft., the exposed part of each shingle being 4 in. wide and 5 in. long, at $4.00 per thousand?

13. How many bundles of laths, each of which covers 6 sq. yd., will be required for the walls and ceiling of a room 16 ft. by 15 ft., the ceiling being 9 ft. above the base-board and an allowance of 65 sq. ft. being made for the openings?

14. A corner lot is 120 ft. long and 36 ft. wide. How much will it cost, at $.80 per square yard, to lay a concrete sidewalk 6 ft. wide on two sides of it?

15. A corner lot has 96 ft. front and is 180 ft. deep. Find the cost of laying a 4-ft. stone walk on the front and side at 18 cents per square foot.

16. A room 18 ft. long, 16 ft. wide, and 10 ft. high has a baseboard 10 in. high, and contains three windows each $6\frac{1}{2}$ ft. by 4 ft., and two doors each $7\frac{1}{3}$ ft. by 4 ft. Find the cost at $.27 a square yard, of plastering this room, allowing half the area of the openings.

Papering

1. Find the cost of plain paper at $1.25 a double roll, for a room 18 ft. long and 15 ft. wide, using strips 8 ft. long.

2. Find the number of single rolls of paper for the ceiling and the walls of a hall 24 ft. long, 6 ft. wide, and 8 ft. above the baseboard.

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3. How much will it cost, at $1.50 per double roll, to paper the ceiling of a room 48 ft. long and 25 ft. wide?

4. A room is 16½ ft. by 15 ft. by 12 ft. high. Find the cost, at $.45 a single roll, of papering the walls of the room, making no allowance for openings.

5. Find the cost of papering the walls of a room 30 ft. by 27 ft. by 8 ft. high at $.25 a single roll.

6. A room is 16 ft. by 15 ft. by 8 ft. high. How much will it cost, at $.60 per single roll, to paper the walls, if no allowance is made for the openings?

7. Find the cost, at $.65 a single roll, of papering a room 24 ft. by 15½ ft., and 8 ft. above the baseboard.

8. Find the amount of paper needed for the walls of a room 18 ft. by 15 ft., and 8 ft. above the baseboard which is 9 in. high, allowing for two windows, each 6 ft. by 3 ft., and three doors, each 7 ft. by 3 ft. (Work by method of square measure.)

9. A room is 18 ft. by 14 ft., and 8 ft. above the baseboard. Find the cost of papering the walls, at $.90 a double roll, allowing 36 sq. ft. for openings.

10. A room is 14 ft. by 12 ft., and 8 ft. above the baseboard which is 1 ft. high. It contains 2 doors, each 3 ft. by 8 ft., and 2 windows, each 3 ft. by 6 ft. Allowing for ½ of the openings, how much will it cost to paper the walls of the room, at $.35 per roll for the paper and $.15 per yard for the border?

11. How many rolls of paper will be required for a room 15 ft. by 14 ft., and 8 ft. above the baseboard if there are 2 windows and 1 door, each 3 ft. 6 in. wide? Allow a single roll for every 3½ ft. in the perimeter, leaving out the widths of the door and the windows.

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Measures—Miscellaneous Problems

Reduce:

1. 4 bu. 5 pk. to pints.
2. 7 gal. 4 qt. to gills.
3. 18 T. 7 cwt. 35 lb. to ounces.
4. 998 yd. 2 ft. to inches.
5. .000795 sq. mi. to smaller units.
6. 5 cords 3 cu. ft. to cubic inches.
7. 17 yr. 8 da. 20 hr. to seconds.
8. 898,244 sheets of paper to reams.
9. 3,659 pt. to barrels.
10. 290 bu. to pints.
11. 3,024 gi. to gallons.
12. 320,160 oz. to tons.
13. 384,912 sq. in. to square yards.
14. 89,454 in. to miles.
15. 1,000,000 cu. in. to cords.
16. 550,000 oz. of flour to barrels.
17. 22,869 cu. in. to gallons.
18. 98 bu. to cu. in.
19. 9,720 score to gross.
20. 41,880 lb. of wheat to bushels of 60 lb.
21. 15,080 lb. of corn to bushels of 58 lb.
22. 30,000 lb. of potatoes to bushels of 60 lb.
23. 18,720 lb. of barley to bushels of 48 lb.
24. 21,760 lb. of oats to bushels of 32 lb.
25. 78,400 lb. of flour to barrels of 196 lb.

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26. At $3\frac{1}{2}$ bushels an acre, how many bushels of seed oats will be required for a field 660 feet long and 462 feet wide?

27. Find the selling price, at 25 cents a box, of 250 bushels of pears which were sold in boxes each containing $2\frac{1}{2}$ pk.

28. A grocer bought 95 gallons of vinegar at \$.02 a pint and sold it for \$.25 a gallon. Find his profit.

29. Find the value of a shipment of 175 bbl., of 200 lb. each, of beef at \$9.25 per hundredweight.

30. A telegraph company purchased 250 miles of wire at \$.00$\frac{1}{2}$ a foot. What was paid for it?

31. A field, 55 rods long, contains 11 A. How many feet of fencing are necessary to enclose it?

32. Find the value, at \$76 an acre, of a farm, rectangular in form, which is 96 rods long and 75 rods wide.

33. How many thousand shingles will it take for a roof whose ridge-pole is 50 ft. and rafters 20 ft., if 5 inches in length and 4 inches in width of each shingle is exposed to the weather?

34. How many feet, board measure, are there in 200 boards 12 ft. long, 10 in. wide, and $\frac{3}{4}$ in. thick?

35. How many bricks, allowing 21 to the cubic foot, would be used in constructing the walls of a house 25 ft. by 30 ft. and 9 ft. high, if the walls were 1 ft. thick and 220 cubic feet were allowed for openings?

36. A room 12 ft. long, 10 ft. wide, and 11 ft. high, has 2 windows each 6 ft. by $3\frac{1}{2}$ ft. and 3 doors each 7 ft. by $3\frac{1}{2}$ ft. What will it cost to plaster the room if \$.60 per square yard is charged?

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37. Find the cost, at $1.15 a sq. yd., of carpeting a room 18 ft. long, 12 ft. wide with carpet $\frac{3}{4}$ of a yd. wide and running lengthwise.

38. Find the capacity in gallons of a tank 22 ft. by 14 ft. by 6 ft., allowing 231 cu. in. to a gallon.

39. Find the number of boards 12 ft. by 12 in. by 1 in. that can be cut from 15 squared logs each 24 ft. by 12 in. by 13 in., allowing 1 inch waste on each log for cutting.

40. 308 cu. yd. of earth were removed in excavating a cellar 66 ft. long and 6 ft. deep. What was the width of the cellar?

41. A man worked 9 hr. a day every week-day during the year 1911. If January first came on Sunday, how much did the man earn, at $.32 per hr.?

42. A grocer purchased 25 bbl. of flour at $4.50 a barrel. He retailed the flour in 24½-pound sacks which he sold at $.72 a sack. How much profit did he make?

43. How many sheets of mounting-paper, each 27 in. by 30 in., are needed to make 30 doz. mounting cards, each 5 in. by 9 in.?

44. A man exchanged $1,461 for English money at the rate of $4.87 for one pound. How many pounds did he receive?

45. Find the cost of the following bill of lumber:
40 boards 14′ long, 10″ wide and $\frac{7}{8}$″ thick at $31.50 per M.
30 boards 15′ long, 10″ wide and $\frac{3}{4}$″ thick at $30. per M.

46. A room 27 ft. wide is covered with 120 yd. of carpet $\frac{3}{4}$ yd. wide. How long is the room?

47. Find the entire surface of a cube whose edge is 18 in.

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48. Find the difference in area between two lots, one 260 ft. long and 200 ft. wide, and the other 240 ft. long and 180 ft. wide.

49. A pasture which is 907½ ft. wide contains 22 A. How many rods of fence are required to enclose the pasture?

50. Find the value, at $100 an acre, of a field in the shape of a trapezoid which measures 98 rd. and 52 rd. along its parallel sides, and is 30 rd. wide.

51. How many square feet are in two triangular flower beds, one with a base of 16 ft. and an altitude of 10 ft., the other with a base of 20 ft. and an altitude of 18 ft.?

52. A triangular park contains 3,690 sq. ft. The longer of the two sides which form a right angle is 90 ft. What is the length of the shorter?

53. Find the cost, at $1.20 per square yard of repairing a piece of asphalt pavement 7 ft. wide and 12 ft. long.

54. A field in the form of a trapezoid contains 114.75 A. Find the altitude, the parallel sides being 108 rd. and 96 rd. long.

55. Find the cost of paving a circular court 98 ft. in diameter at 5 cents a square foot.

56. Find the distance around a circular park which has an area of $49\frac{7}{80}$ A.

57. How much will it cost, at 25 cents a square yard, to paint the lateral surface of a cylindrical tank whose diameter is 6 ft., and whose height is 15 ft.?

58. A woman papered the entire inside of a packing box 5 ft. by 7 ft. by 6 ft. high. How many square feet of paper did she use?

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59. Find the value, at $1.00 per bu., of the wheat contained in a bin which is 4 yd. high and has a base 15 ft. square.

60. A cylindrical oil tank has a base 25.1328 ft. in circumference and 7 ft. high. How many gallons of oil will it hold?

61. A cylindrical marble column in a temple has a volume of 301.5936 cu. ft. and a height of 16 ft. What is the length of its diameter?

62. Find the volume of a pyramid which has a base 72 ft. square and has an altitude of 20 ft.

63. If a funnel in the shape of a cone were closed at the bottom, how many cubic inches would it hold, the circular top having a diameter of 6 in. and the altitude being 9 in.?

64. Find the weight, allowing 450 lb. to the cubic foot, of a cast-iron ball having a radius of 9 in.

65. A circular standpipe 72 ft. high is 24 ft. in diameter. When $\frac{3}{4}$ full, how many gallons of water does it contain, allowing $7\frac{1}{2}$ gal. to a cubic foot?

66. Find the cost, at $3.85 per square yard, of paving $1\frac{2}{3}$ mi. of street 78 ft. wide.

67. A schoolroom is 30 ft. long, 21 ft. wide and 12 ft. high. There are 40 pupils in the room. How many square feet of floor space are allowed for each pupil? How many cubic feet of air for each pupil?

68. A garden was 119 ft. long and 69 ft. wide. A walk 3 ft. wide was placed around the outside of the garden. At $.75 a sq. yd. what did the walk cost?

69. At $25 per M., what will be the cost of twelve 8 x 10 sills 16 ft. long?

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PERCENTAGE

To Find a Per Cent of a Number

Find the following:

1. 14% of 725 miles.
2. 28% of $2,008.
3. 37% of 496 gal.
4. 29% of 34.75 pounds.
5. 52% of .846 mile.
6. 46% of 1,728 cubic inches.
7. 39% of 763 hours.
8. 102% of 98 bushels.
9. 135% of 4,285 feet.
10. $133\frac{1}{3}\%$ of 627 sheep.
11. 250% of 3,198 acres.
12. 1,000% of $4,265.
13. $\frac{1}{3}\%$ of $\frac{3}{4}$ acre.
14. $\frac{3}{8}\%$ of $\$33\frac{1}{3}$.
15. $\frac{9}{10}\%$ of 4,000 miles.
16. $\frac{3}{4}\%$ of 2,680 bushels.
17. $\frac{1}{8}\%$ of $3,600.
18. $6\frac{2}{3}\%$ of 9,600 pounds.
19. $3\frac{1}{3}\%$ of 891 gallons.
20. $6\frac{1}{4}\%$ of 640 tons.
21. $9\frac{1}{11}\%$ of 858 rods.
22. $33\frac{1}{3}\%$ of $37\frac{1}{2}$ pints.
23. $66\frac{2}{3}\%$ of 16,800 days.
24. $11\frac{1}{9}\%$ of 300 hours.

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25. $18\frac{1}{2}\%$ of 4,672.
26. $26\frac{2}{4}\%$ of 765.
27. $45\frac{1}{8}\%$ of 5,240.
28. $74\frac{1}{3}\%$ of 6,000.
29. .2% of 2,168.
30. .5% of 8,472.
31. .01% of 8,006.
32. .15% of 336.
33. .126% of 248.
34. 2.4% of 780.
35. .66% of 48.
36. 1.35% of 7,000.
37. $.85\frac{1}{2}\%$ of 603.
38. $.7\frac{3}{4}\%$ of 546.
39. $.2\frac{1}{3}\%$ of 60.
40. $.5\frac{3}{8}\%$ of 1,800.

1. A farm contained 4,286 acres of land. 27% of it was planted with oats, 34% with barley and 35% of the remainder with rye. How much was planted with rye?

2. An agent traveled 2,468 miles. He traveled $87\frac{1}{2}\%$ of it by rail and the rest by water. How far did he travel by water?

3. There were 13,125 bushels of grain in an elevator. $42\frac{6}{7}\%$ of this was destroyed by fire. How many bushels were left?

4. A railroad shipped 3,597 carloads of freight one month and $66\frac{2}{3}\%$ as many the following month. How many carloads were shipped both months?

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5. Some workmen removed 12,000 cubic feet of earth from one cellar and 62½% of this amount from another. How many cubic yards of earth were removed from both?

6. A contractor purchased 276 bundles of shingles. He used 16⅔% of them on one building and 25% of the remainder on another. How many bundles had he left?

7. A tank having a capacity of 67½ gallons is 37½% full. How many more gallons will it hold?

8. A man who received a salary of $2,225 a year spent 18% of it for rent, 26% of it for food, and 15% of the remainder for fuel and lighting. How much did he spend for each?

9. A speculator having $10,875 made the following investments: 27% of it in railroad stock, 35% of it in mining stock and 75% of the remainder in bank stock. How much more did he invest in bank stock than in railroad stock?

10. A ranchman owned 4,268 sheep. He sold 75% of them to a meat dealer, receiving an average price of $6.48 for each. How much did he receive for the sheep which he sold?

11. There were 2,970 bushels of wheat raised on a farm. 83⅓% of it was sold at 56 cents a bushel. The remainder was sold at 48 cents a bushel. How much was received for the entire crop?

12. From a tract of land containing 572 acres, 62½% was sold for $24,310. What was the selling price per acre?

13. From a bank account of $9,435.00, 16⅔% was drawn at one time and 24% of the remainder at another. How much of the original account was left?

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14. There were 4,000 trees planted in a government park. 5% of them died. 28½% of the remaining trees were elm trees, 42½% were oak trees and the rest were maple trees. How many trees of each kind were there?

15. The profits of a business firm for three years amounted to $42,860. A was entitled to 36% of this amount, B to 48% of it and C to the remainder. What was each man's share?

16. A farmer raised 3,648 bushels of grain. 45% of this amount was corn, 75% of the remainder was wheat, and the rest was oats. Of which kind of grain did he raise the largest quantity?

17. A, B and C began business with a capital of $14,675. They gained 14⅔% of it the first year and 16⅔% of it the second year. They lost 33⅓% of it the third year. What was the difference between the gains of the first and the second years? Which was greater and how much, the gains of the first two years or the loss of the third year?

18. A commission merchant sold 165 bushels of potatoes at $.85 a bushel and 278 barrels of apples at $2.75 per barrel. He received a commission of 3½% on the potatoes and 4⅓% on the apples. Find the total amount of his commission.

19. A man sold a house for $3,765.50 and a lot for $1,278.75. He deposited the money in a bank for three months and received interest amounting to ¾% of his deposit. At the end of this time he drew out the money and invested it in bonds which yielded 4⅔% interest per year. What was his yearly income from the bond investment?

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20. A commission merchant purchased 198 boxes of oranges at $4.75 per box. 33⅓% of the oranges spoiled. At what price per box was it necessary to sell the oranges in order to have no loss?

21. A shipment of live stock was shipped to a stock yard. There were 296 cows, 87½% as many sheep as cows, and 60% as many hogs as cows and sheep. How many animals were there?

To Find the Per Cent which One Number is of Another

1. What % is 658 of 4,700?
2. What % is 332 of 4,150?
3. What % is 156.67 of 1,880.04?
4. What % is 483 of 6,900?
5. What % is 778 of 3,890?
6. What % is 12.5 of 250?
7. What % is 12 of 400?
8. What % is 52 of 650?
9. What % is 9,825 of 78,600?
10. What % is 1,365 of 9,750?
11. What % is 1,606.4 of 10,040?
12. What % is 225 of 1,250?
13. What % is 4,105 of 16,420?
14. What % is 13.78 of 27.56?
15. What % is 397 of 1,191?
16. What % is 973 of 1,459.50?
17. What % is 2,084 of 52,100?
18. What % is 720.72 of 6,006?

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19. What % is 75.31 of 225.93?

20. What % is 47.095 of 329.66$\frac{1}{2}$?

21. What % is 102 of 425?

22. What % is 228 of 2,400?

23. What % is 8.25 of 330?

1. A man pays an annual rent of $240. What per cent of his yearly income of $1,800 is this?

2. I deposited $1,850 in a bank in January, and drew out $314.50 the following month. What per cent of my money remained in the bank?

3. A man owned 1,680 acres of land. He sold 945 acres. What per cent of his land did he still own?

4. The registration of a certain school was 2,160 pupils. 108 pupils were absent one day. What per cent were present?

5. A man paid $\frac{7}{16}$ of a debt of $1,696. How much money did he pay? What per cent of the debt was the payment?

6. I bought a house for $5,000 and sold it for $4,250. My loss was what per cent of the cost?

7. The cost of a quantity of wheat was $900. The selling price was $1,062. The gain was what per cent of the cost?

8. The cost of a house and lot was $6,300. The house alone cost $4,285. The lot cost what per cent of the cost of the house?

9. A commission merchant purchased 500 bushels of potatoes. He then sold part of them for $238 at $.85 a bushel. What per cent of the potatoes did he sell?

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10. An agent sold produce for a farmer which amounted to $4,500. He sent $4,350 to the farmer and kept the remainder of the money for his services. What per cent was his compensation of the selling price of the produce?

11. A grocer sold berries at $.12½ a quart for which he paid $3.20 a bushel. What per cent did he gain on each quart?

12. A farmer paid $25,200 for a farm of 350 acres and sold 75 acres for $3,060. What per cent of the cost did he lose on the part which he sold?

13. A piece of property was sold for $3,248 which was a loss of $752. What would the gain per cent have been if it had been sold for $5,200?

14. I purchased a farm worth $9,375, giving $1,825 in cash and promising to pay the remainder in five years. What per cent of the purchase price remained unpaid?

15. A coal dealer sold 389 tons of coal during January. His total sales for the winter amounted to 1,945 tons. What per cent of the entire amount did he sell in January?

16. What is the per cent of loss when 52 bushels of a crop of 6,500 bushels of potatoes can not be used?

17. Property sold for $2,198. This was a gain of $423. What per cent of gain would there have been had it been sold for $2,000?

18. A man died and left to his wife 33⅓% of an estate worth $25,458. He left $6,364.50 to his son. The son's money was what per cent of the wife's?

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To Find a Number when a Per Cent of it is Given

1. 150 is 75% of what number?
2. 100 is $8\frac{1}{3}$% of what number?
3. 198 is $112\frac{1}{2}$% of what number?
4. 1,000 is $166\frac{2}{3}$% of what number?
5. 189 is $33\frac{1}{3}$% of what number?
6. 1,200 is 80% of what number?
7. 210 is $12\frac{1}{2}$% of what number?
8. 324 is 200% of what number?
9. 243 is $112\frac{1}{2}$% of what number?
10. 250 is $166\frac{2}{3}$% of what number?
11. 144 is $66\frac{2}{3}$% of what number?
12. 248 is $16\frac{2}{3}$% of what number?
13. 110 is 125% of what number?
14. 375 is $62\frac{1}{2}$% of what number?
15. 291 is 75% of what number?
16. 153 is $112\frac{1}{2}$% of what number?
17. 180 is $112\frac{1}{2}$% of what number?
18. 700 is $166\frac{2}{3}$% of what number?
19. 112 is 175% of what number?
20. 324 is 120% of what number?
21. 201 is 150% of what number?
22. 460 is 115% of what number?
23. 847 is 110% of what number?
24. 345 is 200% of what number?
25. 4500 is $\frac{1}{8}$% of what number?
26. 76 is $\frac{2}{3}$% of what number?
27. 42 is $\frac{2}{4}$% of what number?

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1. A man drew $156.67 from a bank. This was $8\frac{1}{3}\%$ of his deposit. How much had he on deposit?

2. A farm produced 297.57 bushels of wheat which was 39% of the amount of corn produced. What was the amount of corn?

3. 9,936 cubic feet of earth were removed in one week by workmen who were excavating a cellar. This was 46% of the entire amount removed. How many cubic yards of earth were removed?

4. A broker bought several shares of stock for a man and received $4.50 for his services. The amount which he received was $\frac{1}{8}\%$ of the total cost of the shares. Find the cost of the shares.

5. There were 135 apple trees in an orchard. These were $18\frac{3}{4}\%$ of the total number of fruit trees. How many trees of other kinds were there?

6. A farmer put $18\frac{3}{4}$ bushels of wheat in one bin. This was $7\frac{1}{2}\%$ of all his wheat. What was his wheat worth at $\$.59\frac{1}{2}$ a bushel?

7. I paid $102 for furniture. This was $22\frac{2}{9}\%$ of what I had left. How much had I before I purchased the furniture?

8. Workmen laid $68\frac{3}{4}$ miles of railroad track. This was $9\frac{1}{6}\%$ of the track which they still had to lay. What was the total length of the track?

9. A man sold an automobile at a profit of 18.4%, thereby gaining $225.40. What was the selling price of the automobile?

10. By selling a horse and carriage at a loss of 8.5%, I lost $51. What was the selling price of the horse and carriage?

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11. 31 gallons of oil leaked from a tank. This was a loss of $3\frac{1}{3}\%$ of the oil. How much oil was originally in the tank?

12. A man deposited $286 in a bank. This was $27\frac{1}{2}\%$ of the amount which he placed in another bank. How much had he in both banks?

13. A chauffeur drove 32.875 miles one day, thereby covering $6\frac{1}{4}\%$ of the distance which he drove during the week. How far did he drive during the week?

14. A drover sold 112 cattle for $5,796, which was 115% of the cost. If he had gained $37\frac{1}{2}\%$ of the cost, what would have been the average selling price of each?

15. A man who traveled 350 miles had covered $41\frac{2}{3}\%$ of his entire journey. How much farther had he to travel?

16. A farmer ploughed 28.6 acres of land which was $27\frac{1}{2}\%$ of his entire farm. How many acres remained unploughed?

17. After a traveler had gone 490 miles which was 56% of his journey, how much farther had he to go?

18. If the boys in a certain school number 504 and they represent 42% of the whole school, how many girls are there?

19. The population of one city is 67,420 which is $66\frac{2}{3}\%$ of another city. Find the population of both.

20. A parlor which is 18 feet long, 16 feet wide, and 10 feet high contains $66\frac{2}{3}\%$ of the number of cubic feet in a drawing room. How many cubic feet in the latter?

21. If a bank charged me $135.30 for the use of a certain sum of money for a year and this was $5\frac{1}{2}\%$ of the loan, how much did I borrow?

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To Find a Number which Increased by a Per Cent of Itself Equals Another Number

1. What number increased by 5% of itself equals 262.5?

2. What number increased by 4% of itself equals 312?

3. What number increased by 2% of itself equals 408?

4. What number increased by 10% of itself equals 599.5?

5. What number increased by 8% of itself equals 702?

6. 884.25 is 12½% greater than what number?

7. 1,111.5 is 14% greater than what number?

8. 1,164.64 is 16% greater than what number?

9. 1,475 is 18% greater than what number?

10. 2,042.5 is 25% greater than what number?

11. What number plus 50% of itself equals 4,134?

12. What number plus 45% of itself equals 6,242.25?

13. What number plus 70% of itself equals 8,573.1?

14. What number plus 75% of itself equals 120,592.5?

15. What number plus 60% of itself equals 1,249,779.2?

16. What number added to 10% of itself equals 4,840?

17. What number added to 8% of itself equals 7,627.5?

18. What number added to 12½% of itself equals 6,570?

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19. What number added to 14% of itself equals 6,855.96?

20. What number added to 20% of itself equals 1,488?

1. I paid $1,000 for an automobile, which was 166⅔% more than I paid for a carriage. What was the difference in price between the automobile and the carriage?

2. The marked price of a sideboard was $81, but this was 8% more than the price for which it sold. Find the selling price.

3. I sold a farm for $2,990 which was 15% more than I paid for it. How much did I gain?

4. A contractor spent $38,080 in the erection of a building. This amount was 19% more than his estimate of the cost. What was his estimate?

5. 4,320 bushels of grain were raised on a farm in 1912. This was 28% more than the amount raised the previous year. What was the size of the crop in 1911?

6. A salesman traveled 6,242.25 miles one month. This distance was 45% more than he traveled the preceding month. How far did he travel both months?

7. After receiving an increase of 20%, a man's yearly salary was $1,488. What had he been receiving per year?

8. An American ocean liner carried 12½% more passengers on its return trip from Europe than on its outgoing trip. If it carried 2,340 persons from Europe how many did it carry on its outgoing trip?

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9. By increasing the number of trees in his orchard by 37½%, a farmer had 1,826 trees. How many trees had he at first?

11. A ship made a distance of 2,658 miles during a certain trip, which was an increase of 20% over its distance the preceding trip. Find the distance covered on the preceding trip.

12. A farm yielded a crop of 4,606 bushels of grain in 1912. This was an increase of 16⅔% over the crop of 1911. Find the difference in size between the two crops.

To Find a Number which Decreased by a Per Cent of Itself Equals Another Number

1. What number decreased by 25% of itself equals 2,250?

2. What number decreased by 33⅓% of itself equals 2,000?

3. What number decreased by 20% of itself equals 640?

4. What number decreased by 25% of itself equals 150?

5. What number decreased by 91⅔% of itself equals 100?

6. 12 is 83⅓% less than what number?

7. 6,300 is 25% less than what number?

8. 1,600 is 33⅓% less than what number?

9. 360 is 20% less than what number?

10. 3,024 is 12½% less than what number?

11. What number minus 37½% of itself equals 2,035?

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12. What number minus 40% of itself equals 2,577?

13. What number minus 15% of itself equals 1,360?

14. What number minus 25% of itself equals 1,701?

15. What number minus 3% of itself equals 1,940?

16. From what number must $16\frac{2}{3}\%$ be subtracted to equal 1,375?

17. From what number must 14% be subtracted to equal 1,290?

18. From what number must $66\frac{2}{3}\%$ be subtracted to equal 3,465?

19. From what number must $12\frac{1}{2}\%$ be subtracted to equal 2,534?

20. From what number must 25% be subtracted to equal 2,571?

1. A young man's salary was $1,125 a year. This was 40% less than his father's salary. How much did the father receive a year?

2. A lecturer traveled 2,856 miles during April. This was $14\frac{2}{7}\%$ less than the distance which he traveled in May. How far did he travel in May?

3. There were 1,425 trees in an orange grove in California which was $28\frac{4}{7}\%$ less than the number of trees in an adjacent lemon grove. How many trees in both groves?

4. A crop of 675 bushels of potatoes was raised on a certain farm one year. This yield of potatoes was smaller by 25% than the crop of the following year. What was the size of the second year's crop of potatoes?

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5. A contractor agreed to erect a house and barn for $5,505. Owing to an increase in the cost of material he found that this amount was 6¼% less than the actual cost of the two buildings. How much did it cost to erect the house and the barn?

6. How much did I lose by selling an automobile for $1,652 which was 12½% less than the cost of it?

7. The distance between two cities by rail is 259.96 miles. If this is 3% less than the distance by water, what is the latter distance?

8. A piano was purchased for $378 which was a deduction of 10% from the marked price. What was the marked price?

9. At the close of a certain year, the books of a wholesale business showed that it was worth $22,785 which was 7% less than its value at the beginning of the year. How much was the loss for the year?

10. The census report showed the population of one city to be 235,422. As this was 13% less than the population of another city, how many inhabitants had the second city?

11. 1,365 pupils attended a certain school during 1912. This was a decrease of 9% of the attendance of the preceding year. How many children attended the school in 1911?

12. A certain class missed 4% of the words written during a spelling examination. As 2,160 words were spelled correctly how many words were written?

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PROFIT AND LOSS

To Find the Profit, Loss, or Selling Price

1. If I buy cloth at $1.20 per yard, at what price must I sell it so as to gain 25%?

2. A horse and carriage that cost $465 were sold at an advance of 2½%. What was the selling price?

3. A carriage that cost $369 was sold at a loss of 12½%. What was the loss and the selling price?

4. A speculator sold a cargo of wheat which cost him $8,462, at a gain of 40%. What was the selling price?

5. Paid $278 for a team of horses, and sold them at a profit of 4%. What was the selling price?

6. I paid $1,750 for each of two lots. I sold one at a loss of 14% and the other at a gain of 14%. Did I gain or lose?

7. A business worth $3,750 increased 16% the first year and 18% the second year. How much was it worth at the end of the second year?

8. I bought 240 barrels of apples at $1.75 a barrel. 40 barrels decayed. At what price a barrel must I sell the remainder to gain 25% on the money invested?

9. Bought a barrel of syrup for $20. What must I charge a gallon in order to gain 20% on the whole?

10. Two men invested $4,560 in business. They lost 13⅓% of it the first year, and 12½% of the remainder the second year. How much was their business then worth?

11. A man who invested $3,250 in business, gained 18% of it the first year, and 24% of the amount which he then had the second year. How much money had he at the end of the second year?

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12. A shoe dealer whose stock cost \$4,860, lost $8\frac{1}{3}\%$ of it the first year, $11\frac{1}{9}\%$ of the remainder the second year, and $9\frac{1}{11}\%$ of what then remained the third year. What was his entire loss?

To Find the Rate Per Cent of Profit or Loss

1. What per cent was gained on goods costing \$4,004 and selling for \$6,406.40?

2. A cow which cost \$75 was sold for \$87.50. What per cent was gained by the transaction?

3. A lot which cost \$1,250 was sold at an advance of \$125. What was the rate per cent of gain?

4. A man sold 15 bu. of potatoes at \$.60 a bushel, thereby gaining \$2.25. Find the rate per cent of gain.

5. A man bought a farm of 196 acres for \$9,800 and after spending \$980 for improvements, sold the farm at \$66 an acre. What was his per cent of gain?

6. I bought 15,786 lb. of hay at \$12 per ton and sold it at \$14 per ton. Find the whole gain and the gain per cent.

7. Bought 10 pieces of cloth containing 35 yards each for \$28, and sold them at retail at $12\frac{1}{2}$ cents a yard. Find the whole gain and the gain per cent.

8. A publisher sold for \$13,520 his stock of books which cost him \$18,750. What was the rate of loss?

9. By selling $\frac{4}{5}$ of a farm for $\frac{3}{4}$ of the cost, what per cent is lost?

10. By selling $\frac{3}{4}$ of a farm for $\frac{4}{5}$ of the cost, what per cent is gained?

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To Find the Cost

1. Goods were sold for \$3,960 which was 62½% of their cost. What was the cost of the goods?

2. A jeweler sold a case of silver for \$156.60, which was a loss of 13%. What per cent would he have made by selling it for \$207?

3. A man sold a carriage for \$207, thereby gaining 12½%. How much did he gain?

4. An article sells for \$1.29. If the profit is 50%, what was the cost?

5. A man sells a farm of 300 acres for \$6,375, thus losing 15% on its cost. How much did he pay for the farm per acre?

6. A house was sold for \$7,050 at a loss of 6%. For what price should it have been sold in order to gain 15%?

7. If 240 lb. of sugar are sold for \$19.20 at a gain of 28%, what was the cost per pound?

8. A merchant gained 12½% by selling 48 yards of silk for \$4.50 more than cost. Find the cost per yard of the silk.

9. By selling a horse at 4⅔% profit, a gain of \$21 is made. Find the cost and the selling price.

10. A man sold 2 horses for \$100 each. On one he gained 25%, and on the other he lost 20%. Did he gain or lose on both, and how much?

11. A merchant sold a case of goods which cost \$14.40 at 10% below the marked price, thus gaining 25% on the cost. Find the marked price.

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12. A merchant buys cloth at \$1.20 a yard and marks it so as to sell it at a discount of 20% from the list price and still gain 20%. Find the list price of the goods.

13. Each of two men, A and B, desired to sell his horse to C. A asked a certain price, and B asked 40% more. A then reduced his price 20%, and B his price 30%, at which prices C took both horses, paying for them \$178. What was each man's asking price?

14. By selling $\frac{5}{8}$ of an oil well for what $\frac{9}{10}$ of it cost, what per cent is gained?

15. I sell goods at 15% below the marked price and still make a profit of 10%. What per cent above cost was the marked price?

16. A merchant sold goods for \$1,125. He sold half at an advance of 25% on the cost, two-fifths at an advance of $12\frac{1}{2}$%, and the remainder at $\frac{1}{2}$ the cost. What did he pay for the goods?

17. A dealer sold cloth for 10% less than the marked price and still made a profit of 20%. If he bought the cloth for \$1.20 a yard, what was the marked price?

18. A property owner lost \$2400 or 8% of his property. What was it then worth?

19. A speculator sold stock for \$18,000 at an advance of 20% on what he paid for it. What did he gain?

20. A horse was sold for \$315 at a gain of $16\frac{2}{3}$%. If it had been sold for \$225 what would the rate per cent of loss have been?

21. If I purchased a house for \$4200, at a loss of $12\frac{1}{2}$% to the owner, what did it cost the owner?

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COMMISSION

To Find Commission

1. A real estate agent sold two houses for a man, receiving $3,750 for one and $4,125 for the other. What was his commission at 2¼%?

2. An agent invested $1,765 in railroad stock for me. I gave him a commission of 2⅜% of this amount. How much did he receive?

3. A commission merchant sold 285 bushels of potatoes at $.65 per bushel and 384 barrels of apples at $2.50 per bbl. for a farmer. He received 3⅓% of the selling price for his services. How much did he remit to the farmer?

4. A book agent sold 68 dictionaries at $8.75 apiece and 24 encyclopedias at $15.45 apiece. He received a commission of 6⅔%. How much did he receive for his sales?

5. In addition to his regular salary, a clerk received 3½% on all his sales. His salary for one week was $18.50 and his sales during the same week amounted to $647.58. How much did he receive for the week's services?

6. An agent collected rents amounting to $2,069. If his commission was 4½%, how much did he give to his employer?

7. A piece of land worth $45,612 was sold at a commission of 6¼%. Find the proceeds of the sale.

8. Which was more profitable and how much more,—a salary of $1,250 per year or a commission of 6% on sales amounting to $18,500?

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9. An agent collected debts amounting to $12,768 and received a 4½% commission for the same. How much money did he remit?

10. An auctioneer sold goods on a commission of 6%. His sales on three consecutive days amounted to $658, $495 and $782. What was his commission?

11. A real estate agent sold property amounting to $6,428. After deducting his commission of 5%, he invested the remainder in other property at the same rate of commission. How much did he receive for both transactions?

To Find the Rate Per Cent of Commission.

1. A real estate agent's commission for selling goods amounting to $5,486 was $205.72½. What was his rate of commission?

2. A collector received $180 for collecting debts amounting to $6,000. Find the rate of commission.

3. What per cent of commission did an agent receive, who was given a commission of $75 for purchasing cotton amounting to $2,500?

4. I earned $250 for selling a house valued at $12,500. What per cent of the selling price of the house did I receive?

5. A farmer paid a commission merchant $250 on a sale of produce worth $5,000. What rate of commission did he allow the merchant?

6. If I sold a consignment of cotton worth $15,850 for a man and received a commission of $277.38, what rate per cent of the sale did I receive?

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7. An agent purchased property worth $5,000 for a business firm and received a commission of $175 for his services. Find the rate of commission.

8. The commission allowed on purchases of property worth $24,500 was $306.25. What was the rate of commission?

9. What is the rate of commission when $14.10 is paid for collecting rents amounting to $282?

10. My commission for buying $8,672 worth of grain was $216.80. What per cent of the amount spent for grain did I receive?

11. An agent sold property for $5,580, and sent the owner $5,496.30. What per cent commission did he receive?

12. An agent remitted $3,820 to a man for whom he sold produce after he had deducted freight charges amounting to $275 and his commission of $105. What per cent of the sale did the agent receive?

To Find the Amount of Sales, etc.

1. What was the amount of sales when the commission at 3½% amounted to $37.10?

2. Find the selling price of a consignment of grain for which an agent received $120.33 at a 6% rate.

3. A book agent received $60.30 for selling books on a 40% commission. What was the selling price of the books?

4. What was the amount of sales, when a commission of $14.28 was allowed at a 3½% rate?

5. An agent sold wheat on a commission of 3¼%. If his commission was $74.10, what sum did he send to the owner of the wheat?

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6. A commission merchant sold a consignment of fruit on a commission of 2½%, and sent the consignor $3,412.50. What was the commission?

7. A collector who worked for a 5½% commission, sent his employer $1,587.60. Find the amount collected and the commission.

8. An auctioneer received 3½% of the value of his sales, and remitted $1,235.20 to the owner. What was his commission?

TRADE DISCOUNT

To Find the Trade Discount

1. A retail merchant purchased goods amounting to $1,476 and was allowed discounts of 33⅓% and 10%. How much did he pay for the goods?

2. A bill of goods purchased from a hardware merchant amounted to $1,286. If the merchant allowed discounts of 12½% and 20%, how much was paid for the goods?

3. From a marked price of $925, a dealer allowed 28 and 4% off. What was the amount paid?

4. A buyer received discounts of 25 and 4% from a list price of $250. What was the total amount of the discounts?

5. A man purchased dry-goods which amounted to $925, but the dealer allowed discounts of 30,5 and 4%. How much was paid for the goods?

6. Merchandise which was valued at $650 was sold at a reduction of 25% of this amount, with an allowance of 5% discount for cash. What was the actual selling price?

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7. A buyer purchased goods valued at $2,000 for 45% of their cost and received 7 per cent off for cash. What did he pay for the goods?

8. What did a grocer pay for a bill of groceries amounting to $735, on which he was allowed 15, 12, and 4% discounts?

9. The marked price of a quantity of jewelry was $1,258, but the manufacturer allowed 33⅓, 10, and 5% off. What was the total amount of the discounts?

10. The list price of furniture was $2,145. How much was paid for it if discounts of 12½, 5, and 3⅓% off were allowed?

11. A bill of goods amounted to $764. Discounts of 33⅓, 9, and 4% were allowed. What was the difference between the amount of the bill and the actual cost?

12. Find the actual cost of goods marked at $2,570 which were purchased for 20% of the marked price, with discounts of 12½ and 4%.

13. Find the single discount equal to a discount series of 20 and 10%.

14. Successive discounts of 25 and 12½% are equal to what single discount?

15. Prove that a single discount of 35⅓% is equivalent to a discount series of 20, 10, and 10%.

16. A man marked his goods down 18½% from the list price, and allowed an additional discount of 6% for cash. What was the entire discount expressed in per cent?

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To Find the Rate Per Cent of Discount.

1. A bill of goods amounted to $800. By paying cash the purchaser secured them for $720. What was the per cent of discount allowed?

2. I bought a bill of groceries amounting to $810, but by paying cash I received them for $40.50 less. What per cent of discount was I allowed?

3. A retail dealer was allowed a discount of $118.90 on goods listed at $475.60. What rate of discount was given?

4. The list price of a piano was $500. Discounts of 20 and 12½% were allowed. What was the total discount? What was the single per cent of discount?

5. By paying cash I secured an automobile marked at $1,750 for $1,610. What per cent of discount did I receive?

6. A purchaser was granted successive discounts of 10 and 8% from a list price of $1,000. What was the net amount of his bill? To what single discount were the successive discounts equal?

7. Find the actual cost of goods marked at $250, but sold for ¾ of their value and 4 per cent off for cash. The entire reduction was equivalent to what per cent of discount?

8. The list price of goods was $400, but they were sold for 20 and 2½% off. What was paid for the goods? The entire discount was what per cent of the list price?

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To Find the Marked or List Price

1. I paid $1,610 for furniture which was a reduction of 8% from the retail price. What was the retail price?

2. The cost of a bill of goods was $1,255.50, which was a reduction of 7% from the marked price. What was the marked price?

3. A grocer paid $518.70 for groceries on which discounts of 5 and 16% had been allowed. What was the marked price of the goods?

4. The net price of a purchase of hardware was $733.59, discounts of 2½, 5, and 10% having been allowed. Find the list price.

5. After discounts of 20, 10, and 5% off had been allowed on the marked price of a machine, the buyer paid $256.50. What was the marked price?

6. A certain bill amounted to $1,217.16 after discounts of 16, 12½, and 8% had been deducted. What was the marked price?

7. Find the list price of goods on which 25 and 12½% had been allowed and which were purchased for $656.25.

8. A dealer who sold goods for $17.50 less than the marked price was allowing a discount of 10%. What was the marked price?

9. An automobile was sold for $206.40 less than the list price. Find the list price if the discounts were 10 and 8%.

10. A firm purchased dry goods for $210 below the marked price, the discounts allowed being 20 and 10%. What was the marked price?

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INSURANCE

To Find the Premium

Find the premiums, at the specified rates, on insurance policies valued as follows:

1. $ 2,500, at 2 %.
2. $ 1,500, at 1½%.
3. $ 9,100, at 2½%.
4. $10,000, at 2¼%.
5. $12,000, at 1⅛%.
6. $18,000, at 2⅛%.
7. $15,000, at 2⅜%.
8. $17,000, at 1⅞%.
9. $25,000, at 1⅜%.
10. $ 3,000, at ⅛%.
11. $ 4,000, at ¼%.
12. $ 3,650, for 5 yr., at ¼% a yr.
13. $ 4,680, for 2 yr., at 1% a yr.
14. $ 2,500, for 3 yr., at ½% a yr.

1. A house worth $12,000 was insured for ⅝ of its value by three companies. The first took ½ of the risk at ⅛%, the second ⅓ of the risk at ¼%, and the third the remainder at ⅜%. What was the whole premium paid?

2. A piece of property valued at $3,600 was insured for ⅚ of its value at 1¾%. What premium was paid?

3. My house valued at $3,000 was insured for ⅘ of its value at ¼% and my furniture valued at $2,000 for ¾ of its value at ¼%. What was the total premium?

4. Property was insured for 83⅓% of its value of $12,600. What was the premium paid if the rate of insurance was ⅜%?

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To Find the Rate Per Cent of Insurance

Find the annual rate of insurance on each of the following:

	Policy	*Premium*	*Time*
1.	$ 7,500	$150	1 yr.
2.	$24,600	$1,230	2 yr.
3.	$ 4,500	$90	1 yr.
4.	$ 8,400	$315	3 yr.
5.	$15,000	$3,000	1 yr.
6.	$ 4,250	$68	4 yr.
7.	$ 1,500	$18.75	1 yr.
8.	$ 1,750	$30.63	1 yr.
9.	$ 5,000	$75	1 yr.
10.	$15,000	$187.50	1 yr.

1. A man pays $36 for an insurance of $4,800 which is $\frac{4}{5}$ the value of his house. Find the rate of insurance and the value of his house.

2. A building worth $4,500 was insured for $\frac{7}{9}$ of its value, at an annual premium of $28. What was the rate of insurance?

3. I paid $45.50 to insure my house, valued at $3,250, for $\frac{4}{5}$ of its value. What per cent did I pay?

4. What rate of premium was paid for insuring a building worth $3,650 for $\frac{4}{5}$ of its value, the premium being $43.80?

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To Find the Amount of Insurance

Find the values of the policies on which premiums at the following rates are paid:

1. \$900, at 2%.
2. \$200, at $1\frac{1}{2}$%.
3. \$600, at $2\frac{1}{4}$%.
4. \$36, at $\frac{1}{4}$%.
5. \$95, at $\frac{1}{8}$%.
6. \$24, at $\frac{3}{4}$%.
7. \$41.25, at $2\frac{1}{2}$%.
8. \$68.24, at $\frac{4}{5}$%, for 1 yr.
9. \$872.73, at $1\frac{1}{8}$%, for 5 yr.
10. \$750, at $1\frac{1}{4}$%, for 3 yr.

1. It costs \$36.18 to insure a store at $\frac{3}{4}$%. Find the face of the policy.

2. A business firm paid \$1,200 once in 3 years for the insurance of property at $\frac{1}{2}$% annually. What was the face of the policy?

3. A man pays \$75 for insuring his house for $\frac{3}{4}$ its value, at $1\frac{1}{4}$%. Find the value of the house.

4. The cost of insuring a house for $\frac{7}{8}$ of its value at $1\frac{1}{2}$%, was \$36.75, and the furniture for $\frac{4}{5}$ of its value, at $2\frac{1}{4}$%, was \$41.85. What was the entire value of the property?

5. A premium of \$131.04, at $2\frac{1}{8}$%, was paid for insuring 90% of the value of a stock of goods. What were the goods worth?

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LIFE INSURANCE

1. A man paid an annual premium of $26.50 per thousand on a life insurance policy of $5,000. How much did he pay in premiums in 5 years?

2. A person paid an annual premium of $5 a thousand on an accident policy. What was the face of the policy if the total annual premium was $38.50?

3. A man who paid an annual premium of 1¼% on a life insurance policy of $2,500 died after he had made 16 payments. How much more did his heirs receive than he had paid?

4. Find the annual premium of a policy of $10,000 at $18.75 a thousand.

5. A man held an endowment policy of $5000 at $85.75 a thousand. Find the annual premium on this policy.

6. In 8 years a man paid premiums amounting to $756.00 on a life policy of $5,000. What is the annual premium for $1000?

7. A person paid an annual premium of $58.50 per $1000 on a 20-year endowment policy of $2,000. What amount had he paid at the maturity of the policy?

8. A man insured his life for $5000 at an annual premium of $35.50 per $1000. After making 6 payments he died. How much more did his heirs receive than he had paid?

9. For 7 years a man made bi-monthly payments of $6.75 as premiums on his insurance policy. What was the total amount of his payments? The annual premium was $13.50 per $1000. What was the amount of the policy?

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TAXES

To Find the Tax

1. Find the tax, at $.02½ per $1.00, on property assessed at $2,000.

2. When the tax rate is 2 cents on a dollar, how much tax must be paid on property assessed at $1,800?

3. A house is assessed for $2,800. If the tax rate is 1⅔%, how much tax must the owner of the house pay?

4. When the tax rate is 13 mills on a dollar, how much tax must be paid on a building assessed for $25,000?

5. How much tax will a farmer pay who is assessed for 275 acres of land at $18 an acre, and for $2,500 personal property, the tax rate being 5½ mills on a dollar and the fee for collecting 1%?

6. A man owned property assessed at $654,850. If the tax rate was 19 mills and he paid a poll tax of $1, what was his entire tax?

7. A man was assessed $54,000 for real estate and $2,000 for personal property. Find the amount of his tax, the rate being 25 mills on a dollar.

8. A man was assessed for two pieces of property, one at $1,800, the other at $12,000. If he paid 20 mills on a dollar and $2 poll tax, what was the entire amount of his tax?

9. I own property worth $7500. Last year the tax was $16 per thousand and this year it is $15.75. What is the amount of my tax for the two years?

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To Find the Tax Rate

1. A tax of $50 was paid on property assessed for $1,500. What was the rate per cent of taxation?

2. Find the rate of taxation when property assessed for $2,550 pays a tax of $51.

3. How many mills were paid on each dollar of property, when $24.50 was paid on $1,225?

4. The valuation of property in a town was $325,250. A man was assessed at $1,650, and paid a tax of $28.05. What was the entire tax?

5. Village property valued at $845,000, was taxed $24,201.50. There were 361 polls at $1.50 each. Find the rate, and a man's tax on property valued at $4,250, he paying 2 polls also.

6. A school-house costing $9,500 is to be built in a district whose property is valued at $1,920,000. Find (*a*) the rate of taxation, (*b*) the amount of tax to be paid by a man whose property is valued at $6,500.

7. A certain town raised a tax of $4,607.50. The real estate was valued at $420,000, the personal property at $189,000 and 1,250 persons paid a poll tax of $1.25 each. Find the tax on one dollar of the property.

8. The assessed value of the property in a town is $3,265,000, and the tax to be raised on the property is $39,180. Find (*a*) the rate of taxation; (*b*) the amount of A's tax whose property is assessed at $15,000, and who pays for 3 polls at $1.25 each.

9. The valuation of property in a certain town is $4,565,000. The tax to be raised on the property is $77,605. What is the tax on $1? On $1000?

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To Find the Assessed Valuation

1. A tax of $51.15 was collected at 30 mills on a dollar. Find the value of the property.

2. A man paid a tax of $170 when the tax rate was $1\frac{8}{5}\frac{8}{2}\%$. What was the assessed value of his property?

3. For what sum was a building assessed when a tax of $224 was paid, the rate being $11\frac{1}{5}$ mills?

4. A tax of $300 was paid on a building when the rate was $1\frac{5}{7}\%$. For how much was the building assessed?

5. A man pays taxes amounting to $68.31, after receiving a rebate of 1% for prompt payment. If the rate of taxation is $1\frac{1}{2}\%$, what is the assessed valuation of his property?

6. The cost of erecting a town building was $3,795. The money was raised by a tax of 23 mills on the dollar. What was the assessed valuation?

7. A tax of $4,331.25 was raised on property when the tax rate was 18 mills. What was the assessed value of the property?

8. The total town tax was $6,352.50. A man's property was assessed at $2,250, and his tax was $49.50. What was the valuation of the town property?

9. Find the assessed valuation of property which was taxed $110,000 when the tax rate was $1\frac{1}{10}\%$.

10. The tax rate of a certain town was $1\frac{1}{8}\%$. If the tax amounted to $6,819.90 what was the assessed value of the taxable property?

11. When the rate of taxation is $2\frac{7}{10}\%$, what is the tax on $1? on $1000? What is the assessed valuation of property which pays a tax of $454.815, at this rate?

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DUTIES OR CUSTOMS

To Find the Duty

Find the ad valorem duty on each of the following invoices of goods at the rate specified:

1. \$4,875; 18%.
2. \$9,653; 25%.
3. \$2,468; 33⅓%.
4. \$18,605; 55%.
5. \$20,550; 37½%.
6. \$75,004; 75%.
7. \$100,000; 40%. .
8. \$19,700; 50%.

9. A dealer imported 135 machines each worth \$200. Find the ad valorem duty at 35%.

10. The duty on a certain product is \$.35 a pound and 25% ad valorem. If the product weighs 150 lb. and is worth \$9750, what is the total duty?

11. A New York jeweler imported \$20,000 worth of uncut diamonds on which he paid an ad valorem duty of 60%, and \$7,500 worth of clocks on which he paid an ad valorem duty of 40%. Find the total duty on the imports.

12. Find the entire cost of importing 2,000 lb. of yarn, invoiced at £240 (£1 = \$4.8665), if the freight charges are \$7.83, and the duty 27½ ct. per pound plus 40% ad valorem.

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To Find the Rate Per Cent of Duty

1. An importer paid $1,905 ad valorem duty on goods valued at $12,700. Find the rate of duty.

2. If a duty of $101.04 ad valorem is levied on goods valued at $842, what is the rate of duty?

3. Ad valorem duty is levied on goods valued at $111.60, making the total cost $161.82. What is the rate of duty?

4. What is the rate of ad valorem duty when a tax of $11,014.49 is levied on goods valued at $28,985.50?

5. An importer purchased merchandise valued at $7,770.70 and paid an ad valorem duty of $3,108.28. What rate of duty did he pay?

To Find the Valuation of Goods

1. What is the invoice of goods on which an ad valorem duty of 35% is paid, the duty amounting to $26,250?

2. If the duty at 37½% is $37,500, what is the valuation on which the duty is reckoned?

3. The cost of importing goods, including the duty, was $83,058. How much was the duty if the rate was 27%?

4. Merchandise cost an importer $32,700, which included the duty of 33⅓%. What was the original cost?

5. I paid $5,428 for imported produce which included the duty at 18%. What was the original cost of the goods?

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INTEREST

To find interest or amount

1. Find the interest and amount of $975, at 6%, for 5 yr. 6 mo.

2. A man borrowed $1,920, Jan. 7, 1905, at 4%, and on Jan. 16, 1907, he paid the amount due. How much was due?

3. A note for $1,850 was given Mar. 2, 1907, payable June 20, 1910, with interest at 3½%. What was due on settlement?

4. A speculator borrowed $1,780, Apr. 27, 1910, at 10%, and paid the note in full Apr. 9, 1912. How much did he pay?

5. A note for $1,375 was given June 6, 1902, with interest at 7%, and on Oct. 30, 1906, the amount was paid. How much was it?

6. A man borrowed $1,890 for 10 yr. 8 mo. 8 da., at 5½%. What was due on settlement?

7. Loaned a man $1,980, Mar. 23, 1911, and on Dec. 5, 1911, he paid the amount due. If the rate of interest was 5%, what was the amount?

8. Find the amount of $1,893 for 12 yr. 9 mo. 3 da., at 5¼%.

9. A note for $2,040 was given Sept. 14, 1910, with interest at 6%. What was due on settlement, Apr. 4, 1911?

10. A note for $1,230 was given June 27, 1910, with interest, at 6%. No interest having been paid, what was due on settlement, June 7, 1912?

11. Find the amount of $265 at 4½% simple interest from July 12, 1892, to Mar. 14, 1893.

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12. Find the amount of $945.15 from Dec. 15, 1891, to Nov. 22, 1892, at 4½% simple interest.

13. Find the amount of $216, at 2½% simple interest from July 28, 1899, to Feb. 4, 1902.

14. Find the amount of $864 for 1 yr. 3 mo. 15 da., at 5% simple interest.

15. A note for $365 was given Jan. 15, 1895, with interest at 5½%. What was due on settlement Aug. 29, 1895?

16. Find the amount of $375 for 11 mo. 17 da. at 4½% simple interest.

17. What is the amount of $1,250 for 1 yr. 4 mo. 20 da. at 5½% simple interest?

18. Find the amount of a $486.50 note given for 1 yr. 5 mo. 17 da. at 5½% simple interest.

19. Find the interest on $850, at 5%, from Apr. 9 to July 12, same year.

20. Find the interest on $640.80, at 6%, from Mar. 15, 1891, to June 24, 1891.

To find principal

1. The interest on a sum of money, at 5½%, from June 1, 1910 to Mar. 19, 1912, was $51.48. How much was borrowed?

2. I loaned a friend a certain sum of money at 6%, Feb. 3, 1909, and on Dec. 30, 1910, he paid the amount due, which was $646.41. How much of this was interest?

3. A loaned B a sum of money May 7, 1904, at 6½%, and on Jan. 19, 1906, B paid the interest due, which was $70.72. How much did A loan?

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4. A sum of money was borrowed Jan. 2, 1902, at 3%, and on Feb. 8, 1905, the amount, which was $1,289.74, was paid. What was the interest?

5. A speculator borrowed a sum of money Apr. 3, 1905, at 4%, and on Sept. 24, 1908, he paid the interest due, which was $179.31. How much did he borrow?

6. A capitalist loaned a sum of money for 1 yr. 4 mo., 15 da., at 6%, and received $39.60 interest. How much did he loan?

7. A man borrowed a certain sum of money Sept. 9, 1900, at 5%, and on Feb. 3, 1904 he paid the amount due, which was $1,667.25. How much did he borrow?

8. The amount for 1 yr. 1 mo. 6 da., at 3%, was $278.91. What was the interest?

9. The interest on a sum of money for 1 yr. 2 mo. 12 da., at 3½%, was $13.65. Find the principal.

10. The amount of a certain principal for 1 yr. 3 mo. 9 da., at 4%, was $399.38. Find the principal.

11. I loaned a man a certain sum of money for 1 yr. 4 mo. 24 da., at 4½%, and received on settlement $478.35. How much of this was interest?

12. A note dated Apr. 6, 1910, due Nov. 12, 1911, yielded $38 interest. If the rate was 5%, what was the face of the note?

To find time

1. The interest on $950 for a certain time, at 4%, was $145.35. For what length of time was the money loaned?

2. I loaned $350, July 3, 1910, at 4%. On settlement I received $365.40. What was the date of payment?

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3. A merchant borrowed $375, Nov. 14, 1908, at 4½%, and on settlement paid $395.25. When did he return the money?

4. The amount of $1,010 for a certain time, at 4%, was $1,077.67. Find the time.

5. In what time, at 6% will $780 amount to $911.43?

6. The interest on $750 for a certain time, at 5%, was $97.50. Find the time.

7. In what time, at 6%, will $1,200 amount to $1,389?

8. A note for $420 was given May 5, 1907, at 5%, and on settlement $447.30 was paid. What was the date of settlement?

9. How long will it take $800 to produce $75 at 6%?

To find rate

1. The interest on $1,000 from Feb. 14, 1899, to Jan. 8, 1902 was $159.50. What was the rate?

2. Mr. Lee borrowed $1,110, Mar. 15, 1909, and on Feb. 21, 1912, he paid the amount due, which was $1,305.36. What was the rate of interest?

3. A capitalist loaned $1,260, Oct. 17, 1904, and on Dec. 12, 1907, he received the amount due, which was $1,522.08. What rate of interest did he charge?

4. The amount of $1,560 for 3 yr. 10 mo. 24 da. was $2,016.30. What was the rate?

5. The amount of $1,620 for 3 yr. 8 mo. 12 da. was $2,099.52. What was the rate per cent?

6. At what rate per cent will $990 in 2 yr. 8 mo. 12 da. gain $133.65 interest?

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7. The interest on $960 for 2 yr. 5 mo. 18 da. was $106.56. What was the rate?

8. A note for $1,450 was given May 2, 1904 and on Feb. 20, 1908, the amount, which was $1,835.70, was paid. What was the rate of interest?

9. In 1 yr. 4 mo., $311.50 amounted to $336.42, at simple interest. What was the rate per cent?

COMPOUND INTEREST

1. What will be the amount due on a note for $800, bearing 6% interest, compounded annually, if no payments are made until the time of final settlement 2 years later?

2. A debt of $520 bearing 6% interest, compounded annually, was paid in full 3 years after the date it was contracted. If no previous payments had been made, how much was due at final settlement?

3. A man deposited $500, Jan. 1, 1910, in a savings bank which paid interest, compounded semi-annually, at 4%. On July 1, 1910 he made another deposit of $675. If he made no withdrawals until Jan. 1, 1911, how much money should he have received?

4. What is the compound interest on $750 for 3 yr. 8 mo. 15 da., at 6% interest, being compounded annually?

5. What will be the amount due June 1, 1889, on a debt of $900, bearing 6% interest, compounded quarterly, if the debt bears interest from July 1, 1888?

6. Find the compound interest on $500 for 3 years, at 6%, interest being compounded semi-annually.

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7. A debt of $7,150, dated March 27, 1885, and bearing 6% interest, payable quarterly, was paid in full July 5, 1886. If no previous payments had been made, how much was due at final settlement?

Find the Compound Interest on the following:

	Sum	Interest Compounded	Length of Time	Rate of Interest
a	$800	annually	2 yr.	6½%
b	520	annually	3 yr.	5½%
c	975	annually	2½ yr.	5 %
d	600	semi-annually	2½ yr.	5 %
e	900	semi-annually	1½ yr.	7 %

PARTIAL PAYMENTS

1. On a note for $700, dated Oct. 15, 1898, due in one year, with interest at 5%, the following payments have been made: March 9, 1899, $300; June 1, 1899, $250. Find the amount due at maturity.

2. $850 Buffalo, N. Y., May 25, 1888

Six months after date, I promise to pay J. R. Lee, Eight hundred fifty $\frac{00}{100}$ Dollars, with interest at 6%, for value received.

William Jennings.

Indorsements; August 13, 1889, $50; November 7, 1890, $324.95. What was due March 25, 1891?

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Find the amounts due on the date of final settlement of the following notes and mortgages.

3. Principal $800.00, dated April 1, 1911, with interest at 6%; partial payment July 1, 1911, $12.00; date of final payment August 1, 1911.

4. Principal $150.00, dated Sept. 15, 1912, with interest at 6%; partial payment December 15, 1912, $52.25; date of final payment January 1, 1913.

5. Principal $900.00, dated June 25, 1910, with interest at 6%; partial payment January 1, 1911, $227.90 and July 1, 1911, $500; date of final payment January 1, 1912.

6. Principal $2,000.00, dated May 1, 1910, with interest at 6%; partial payments November 1, 1910, $560.00 and May 1, 1911, $40; date of final payment May 1, 1912.

7. Principal $4,800.00, dated August 15, 1907, with interest at 6%; partial payments made January 1, 1908, $2,000.00 and July 11, 1908, $1,000.91; date of final payment January 1, 1910.

8. Principal $1,000, dated January 1, 1911, with interest at 6%; partial payments made July 1, 1911, $100 and July 1, 1912, $50.00; date of final payment January 1, 1913.

9. Principal $900.00, dated May 1, 1909, with interest at 6%; partial payments made January 16, 1910, $138.25 and October 1, 1910, $34.00; date of final payment May 1, 1911.

10. Principal $500.00, dated January 1, 1893, with interest at 6%; partial payments made July 6, 1892, $125.00 and October 1, 1892, $300.00; date of final payment January 1, 1893.

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BANK DISCOUNT

Banks as a rule charge discount for the exact number of days, counting from date of discount to date of maturity.

To find the date of maturity count forward from the date of the note the number of months if the time is stated in months or the number of days if it is stated in days.

In the following problems notes do not bear interest unless a rate of interest is given.

February has 29 days in leap years.

Find the term of discount and the date of maturity of the following:

	Date of Paper	Time	Date of Discount
1.	Jan. 1	2 mo	Jan. 1
2.	May 1	6 mo.	May 15
3.	Sept. 15	3 mo.	Oct. 1
4.	Mar. 5	60 da.	Apr. 1
5.	Oct. 20	90 da.	Nov. 1
6.	Feb. 7	1 mo.	Feb. 15
7.	Mar. 3	5 mo.	Apr. 1
8.	Feb. 5	30 da.	Mar. 1
9.	Jan. 10	1 yr.	May 1
10.	Apr. 17	90 da.	May 1

1. Find the bank discount on a note for $900, dated May 16, 1886 and payable in 8 months, without interest, if discounted May 30, 1886, at 6%.

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2. Find the bank discount on a note for $660, dated June 18, 1888 and payable in 3 months, without interest, if discounted July 14, 1888 at 5%.

3. Find the proceeds of a note for $850, dated May 1, 1889, payable in 6 months, and discounted July 25, 1889, at 6%.

4. $570 New York, N. Y., March 15, 1890

Six months after date, for value received, I promise to pay Frank G. Winthrop, or order, Five Hundred Seventy $\frac{00}{100}$ Dollars.

Arthur Glenn.

Discounted June 26, 1890, at 6%. Find the proceeds.

5. A dealer sold some flour for $480, taking in payment a ninety-day note, which he immediately discounted in a bank at 6%. Find the proceeds of the note.

6. $650 Chicago, Ill., August 7, 1890

On October 16, 1891, for value received, I promise to pay to M. B. Swift, or order, Six Hundred Fifty $\frac{00}{100}$ Dollars, with interest at 5%.

L. T. Kane.

Discounted July 21, 1891, at 4%. What were the proceeds?

7. A note for $560 payable in 90 days is discounted at a bank, at 6%, 30 days after it is dated. Find the proceeds.

8. Find the proceeds of a 60-day note for $830 without interest, dated December 21, 1901, and discounted January 21, 1902 at 6%.

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9. Find the proceeds of a note for $900 dated December 1, payable in 60 days and discounted December 15 at 6%.

10. Find the proceeds of a note for $350, without interest, dated May 1, 1897, payable in 4 months and discounted July 16, at 5%.

11. Find the proceeds of a note for $500, payable in 90 days, with interest at 6%, if discounted at a bank at 6%, 40 days after date.

12. Find the proceeds of a note for $1,000 due in 90 days, discounted at a bank on the day it was drawn, at 6%.

13. A grocer purchased goods amounting to $425 and gave in payment a four-month note dated Oct. 18, 1903 and bearing 6% interest. The note was discounted at a bank on the day made, at 6%. Find the proceeds.

14. Find the proceeds on a 90-day note for $1,650, with interest at 6%, discounted the day it was drawn at 6%.

15. $1,225 Boston, Mass., April 7, 1904

Sixty days after date, for value received, I promise to pay L. M. Green or order, Twelve Hundred Twenty-five $\frac{00}{100}$ Dollars, with interest at 5%. B. G. Swift.

Discounted Apr. 7, 1904, at 6%. Find the discount.

16. Find the bank discount on a 6-month note for $1,250, dated August 7, 1905, at 5%, if discounted November 15, 1905, at 5%.

17. A four months' note for $584, without interest, is discounted at a bank at 5% on the day of its date. Find the proceeds of the note.

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Find the Date of Maturity, Term of Discount, Discount, and Proceeds of the following:

	Face	Time	Date of Paper	Date of Discount	Rate of Discount
1.	$900	3 mo.	Aug. 1	Aug. 11	6%
2.	1,000	90 da.	Jan 1	Jan 1	5%
3.	4,800	60 da.	Apr. 15	May 1	7%
4.	250	2 mo.	May 1	June 1	6%
5.	300	6 mo.	Jan 1	Jan. 15	6%

To find the face of a note

1. The proceeds of a note, due in 4 months and discounted at 6% on the day it was drawn, is $450.80. What is the face value of the note?

2. Find the face of a 90-day note discounted at 6% that the proceeds may be $360.

3. Find the face of a 60-day note which when discounted at a New York bank will yield $250.

4. A man wishes to borrow $1,725 from a bank. For what sum, due 4 months hence, must he give his note if the bank discounts it at 6%?

5. A bank paid $1,224.37 for a 4-month note, after discounting it at 6%. What was the face of the note?

6. The avails of a 60-day note that had been discounted in a bank at 6% were $474.96. What did the bank charge for discounting the note?

7. The avails of a 3-month note that had been discounted on the day it was drawn, at 6%, were $826.98. What was the face of the note?

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8. A note dated June 12, 1895, due in 9 months and bearing 6% interest, was discounted by a bank January 3, 1896, at 5%. The proceeds were $2,070.09. What was the face of the note?

9. A dealer sold some goods for $3,127.95 due in 60 days. He took in payment a note for that sum which discounted at 4% would just pay for the goods. Find the face of the note.

10. A man raised $962.85 by having his note for 90 days discounted at a bank at 7%. For what sum was the note drawn?

STOCKS AND BONDS

To find the cost or selling price of stock

1. What is the loss on 40 shares of stock bought at $109\frac{7}{8}$ and sold at $106\frac{3}{8}$, brokerage being $\frac{1}{8}$% in each case?

2. A man sold through a broker 176 shares of stock at $96\frac{1}{2}$, brokerage $\frac{1}{8}$%. What sum should the broker remit?

3. How much should be paid for 40 shares of railroad stock at $3\frac{1}{2}$% discount and $\frac{1}{8}$% brokerage.

4. Find the cost of 260 shares of Baltimore and Ohio R. R. stock at $16\frac{1}{4}$, brokerage $\frac{1}{8}$%.

5. How many dollars would a man gain in buying 240 shares of railroad stock at $3\frac{3}{8}$% discount and selling them at $1\frac{7}{8}$% premium?

6. How much money shall I remit to my broker in order that he may purchase for me 24 shares of stock at a premium of $41\frac{1}{8}$ per cent, brokerage $\frac{1}{4}$ per cent, par value $100 per share?

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To find the number of shares that can be purchased for a specified sum of money

1. How many shares of bank stock at 5% discount can be purchased for $3,805, allowing $\frac{1}{8}$% brokerage?

2. I invested $10,650 in railroad stock, purchased at a premium of $6\frac{3}{8}$%, brokerage $\frac{1}{8}$%. How many shares did I buy?

3. How many shares of stock, quoted at $112\frac{5}{8}$, could be purchased with $14,093.75 allowing $\frac{1}{8}$% brokerage?

4. A speculator invested $17,832.50 in mining stock when the market value was $27\frac{1}{4}$% above par. How many shares did he purchase if he paid $\frac{1}{8}$% brokerage?

To find the sum that must be invested to secure a specified income

1. When 6% bonds are selling at $166\frac{1}{2}$, brokerage $\frac{1}{8}$%, how much must be invested to secure an income of $840?

2. What sum must be invested in $6\frac{1}{2}$% stock at 185 to yield an annual income of $481?

3. How much money must be invested in stocks paying 5% and selling at 120, to produce an income of $2,000?

4. When 4% bonds are selling at $131\frac{1}{4}$, brokerage $\frac{1}{8}$%, how much must be invested to secure an income of $720?

To find the income from an investment in stocks

1. A man sold 700 shares of railway stock at $84\frac{1}{8}$ and invested the proceeds in $4\frac{1}{2}$% bank stock at $119\frac{7}{8}$, brokerage in each case $\frac{1}{8}$%. Find the annual income from the second investment.

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2. A man sells 540 shares of 4% stock at 80 and loans the proceeds at 5½%. Find the difference in his income.

3. Find the annual income yielded by an investment of $1,640⅝ in U. S. 4's at 109⅜.

4. Which would be better, to invest $4,356.25 in industrial 4's at 87, brokerage ⅛, or, with the same sum, to purchase real estate which yields a net annual rental of $300?

5. What income will be derived from investing $14,060 in 3½% bonds purchased at 87¾, brokerage ⅛%?

6. What yearly income will $2,267.50 produce when invested in U. S. 4's at 113¼, brokerage ⅛%?

To find the cost of 1 share when the cost of a specified number of shares is given

1. Find the quoted price of bank stock when the cost of 150 shares, including brokerage at ⅛%, is $16,875.

2. Find the market value of mining stock, if 200 shares were purchased with $14,950, brokerage ⅛%.

3. A broker invested $8,911.50 for a man, receiving a brokerage of ⅛%. What was the market value of 1 share, if 78 shares were purchased?

4. Find the quoted price of bank stock when the cost of 125 shares, including brokerage at ⅛%, is $12,406.25.

5. Find the market value of stock, if 250 shares can be purchased with $24,406.25, brokerage ⅛%.

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To find the cost of 1 share when the dividend is a specified rate per cent of it

1. At what price must 5% bonds be bought so as to realize $7\frac{1}{2}\%$ on the investment?

2. A certain stock pays 10%. At what rate must it be bought to yield 6% on the investment?

3. A 2% quarterly dividend declared by a street railway company paid a stockholder at the rate of $11\frac{7}{11}\%$ annually on his investment. At what rate did he purchase his stock?

4. At what price must I buy 5 per cent bonds in order to get 4 per cent on my investment?

To find the rate per cent of gain or loss on sales of stock

1. What is the per cent profit on stocks bought at 90 and sold at 110?

2. I buy stocks at 80 and sell them at par. Find the per cent profit.

3. Find the rate per cent of loss on stock bought at 114 and sold at 95.

To find the rate per cent of dividend or assessment

1. Dividends amounting to $6,250, were distributed among the stock holders of a certain company. If the capital stock was $250,000, what was the rate of dividend?

2. A company having a capital stock of $150,000, lost $3,750 through fire. What per cent was each stockholder assessed in order to pay this loss?

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To find the capital stock when the dividend or assessment at a specified rate per cent is given

1. If a company declared a dividend of $1,038,125 and this was 5½% of the capital stock, what was the capital stock?

2. A company declared an assessment of 4% on its capital stock, which amounted to $238,000. What was the capital stock?

3. Find the value of the capital stock of a company which declared a 6½% dividend amounting to $16,250.

4. A company levied a 3½% assessment on its capital stock to meet expenses amounting to $1,750. What was its capital stock?

To find the rate per cent of income on an investment in stocks

1. School bonds bearing 4½% interest sell at 10% premium. What rate per cent does the buyer get on his investment?

2. A capitalist buys U. S. 4% bonds to the amount of $50,000 par value, at 112⅜, brokerage ⅛%. Find the cost of the bonds and the rate of income on the investment.

3. What per cent income shall I receive on my investment if I buy 6% stock at 20% premium?

4. Received 6% dividend on stock bought at 25% below par. What rate of interest did the investment pay?

5. Find the rate of income on 4% bonds bought at 115.

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RATIO

1. Separate \$774 in the ratio of 4 to 5.

2. Two men invested \$4,500 in a business in the ratio of 8 to 7. How much did each invest?

3. A man left an estate of \$24,000 to his daughter and his son. He gave \$3 to his daughter for every \$5 which he gave to his son. What was the share of each?

4. 1,800 trees were planted in an orchard. There were $\frac{3}{5}$ as many apple trees as peach trees. How many trees of each kind were there?

5. In a school of 900 pupils, the boys are to the girls in the ratio of 13 to 17. Find the number of each.

6. A farmer ground together oats and barley at the ratio of 3 bu. of oats to 2 bu. of barley. If there were 160 bu. of the mixture, how many bushels of each grain were there?

7. In a certain quantity of milk the ratio of the cream to the rest of the milk is as 2 to 9. How many pounds of cream are there in 253 pounds of the milk?

8. Two farmers paid \$35 for the use of a threshing machine. The first had 360 acres of wheat threshed; the second, 480 acres. What amount should each have paid for the use of the machine?

9. The volume of oxygen to that of nitrogen in the air is about 1 to 4. Find the volume of each in a room 15 ft. by 12 ft. by 8 ft.

10. Two brothers formed a partnership, investing \$3,250 and \$4,000 respectively. They divided the profits amounting to \$1,450, in the ratio of their investments. What was the share of each?

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PROPORTION

1. If 10 lb. of rice cost $1.25, what will 25 lb. cost?

2. 27 men do a piece of work in 12 da. How long will it take 36 men to do it?

3. Find the cost of 95 tons of coal when 8 tons cost $64.

4. How long should it take 32 men to build a bridge that 104 men can build in 12 da.?

5. 150 men can construct a building in 24 da. A contractor has agreed to do the work in 18 da. How many more men must he employ?

6. If a staff 3 ft. 8 in. long cast a shadow 1 ft. 6 in., what is the height of a steeple that casts a shadow 75 ft. at the same time?

7. A distance of 150 mi. is represented on a map by $1\frac{1}{4}$ in. How many inches represent a distance of 825 mi.?

8. If a man travel 48 mi. in 12 hr., how many miles can he travel in 60 hr. at the same rate?

9. In how many days should 100 men be able to pave a street if 250 men do the same work in 12 da.?

10. When 43 acres of land yield 2,064 bu. of wheat, how much should 225 acres yield?

11. The interest on $1,126.50 for a certain time is $157.71. Find the interest on $1,840 for the same time and at the same rate.

12. If a stick of timber 6 inches square and 20 feet long costs $1.50 what will be the cost of a stick 8 inches square and 30 feet long?

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13. The wages of 25 men who worked for 13 days of 8 hr. each amounted to $520. What should be the wages of 48 men for 15 days of 9 hr. each?

14. A ditch 270 yd. long, $1\frac{3}{5}$ yd. wide, and 1 yd. deep was dug in $3\frac{1}{3}$ da. of 9 hr. each by 15 men. In how many days of 10 hr. each should 27 men have dug a ditch 360 yd. long, 2 yd. wide and $1\frac{1}{2}$ yd. deep?

15. The duty on 1,536 yd. of cloth valued at $\$2\frac{3}{4}$ per yard was $\$1{,}267\frac{1}{2}$. At the same rate, what should be the duty on 1260 yd. of cloth valued at $\$2\frac{1}{2}$ per yard?

16. If 3 men earn $270 in 45 days, how many men can earn $640 in 20 days?

17. If 9 bbl. of flour last 60 men 18 days, how long will 18 bbl. of flour last 120 men?

18. 8 men dig 288 ft. in 25 days of 9 hr. each. In how many days of 10 hr. will 10 men dig 40 ft.?

19. If 9 men can earn $90 in 5 days, how many men can earn $180 in the same length of time?

20. It costs $94.50 to carpet a room 27 ft. long and 21 ft. wide, with carpet $\frac{3}{4}$ yd. wide, at $\$1\frac{1}{8}$ per yard. What will it cost to carpet a room 18 ft. long and 15 ft. wide with carpet 1 yd. wide at $\$\frac{5}{8}$ a yard?

21. The interest of $1,440 for 3 yr. 9 mo. 18 da. at a certain rate per cent is $410.40. What should be the interest of $1,680 for 2 yr. 7 mo. 15 da. at $\frac{4}{5}$ as great a rate?

22. A bin 24 ft. long, 6 ft. wide, and 5 ft. deep has a capacity of 900 bushels. What is the capacity of a bin 15 ft. long, 6 ft. wide, and 4 ft. deep?

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EVOLUTION

Find the square root of:

1. 1,024.
2. 2,401.
3. 4,096.
4. 7,225.
5. 9,409.
6. 40,000.
7. 225,625.
8. 795,664.
9. 2,560,000.
10. 81,072,016.

Find to two decimal places the square root of:

11. .0361.
12. .0576.
13. .1225.
14. .6561.
15. 1.4641.
16. 200.
17. 550.
18. 8201.
19. 463,556.
20. 876,421.

Find the square root of:

21. $\frac{576}{625}$
22. $\frac{961}{3025}$
23. $\frac{289}{1024}$
24. $\frac{1849}{5625}$
25. $\frac{3136}{11881}$
26. $\frac{3969}{4761}$
27. $\frac{324}{9801}$
28. $\frac{1600}{3025}$
29. $\frac{43.1649}{55.5025}$
30. $\frac{79.5664}{85.9329}$

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The radius of a circle equals the square root of the quotient of the area divided by 3.1416.

Find the radii of the circles whose areas are:

31. 1661.9064 sq. in.
32. 1809.5616 sq. in.
33. 2123.7216 sq. in.
34. 3019.0776 sq. in.
35. 38.484600 sq. in.
36. 141.026424 sq. in.
37. 20106.24 sq. in.
38. 226.9806 sq. in.
39. 18.857454 sq. in.
40. 1.3560684984.

1. Find the distance between two diagonally opposite corners of a rectangular lot which is 60 feet wide and contains 4,800 sq. ft.

2. An orchard containing 9,216 trees is planted in the form of a square, each tree an equal distance from another. How many trees in each row?

3. A tree was broken by the wind in such a way that the top struck the ground at a distance of 24 ft from the foot of the tree. If the part left standing was 45 ft. high, how long was the broken part?

4. How many rods long is one side of a square field containing 10 acres?

5. Find in rods to two decimal places the length of one side of a square field whose area is 3 acres.

6. Find in yards the side of a square field containing 15 A. 109 sq. rd. 3 sq. yd.

7. How much farther would a person walk by going along two sides instead of the diagonal of a rectangular field 91 rd. long and 60 rd. wide?

8. A square room has a diagonal of 15 yards. Find to two decimal places the length of the room.

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9. The area of a square field is 225 square rods. Find to two decimal places the length of the diagonal.

10. A line 62 ft. long reaches from the top of a house 48 ft. high, to the bottom of a house on the opposite side of the street. Find the width of the street.

11. Find the length, to two decimal places, of the longest straight line that can be drawn on the floor of a room 18 ft. by 22 ft.

12. The sides of a rectangle are 8 ft. and 10 ft. Find its diagonal correct to 3 places of decimals.

13. How long must a ladder be to reach a window 15 ft. high, if the foot of the ladder is 8 feet from the house?

14. The area of a lawn whose length is twice its breadth is 392 sq. yd. Find the length and breadth of the lawn.

15. What is the diameter in rods of a circular field containing 17.6715 acres?

16. How many rods of fence are required to inclose a square field containing $24\frac{1}{40}$ acres?

17. A square field contains 18 acres 36 sq. rd. Find the cost of fencing it at \$.65 a rod.

18. A field whose width is $\frac{1}{4}$ its length contains $46\frac{9}{40}$ A. Find the cost of building a fence around it at $\$\frac{3}{4}$ a rod.

19. The length of a rectangular field containing 20 acres is twice its breadth. Find the dimensions of the field.

20. The diagonal of a square field is 40 rd. How many acres does the field contain?

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21. Find the perimeter, in rods, of a square field the diagonal of which is 400 rd.

22. A circular flower bed has an area of 628.32 square feet. Find to two decimal places the length of the radius.

23. The diagonal of a square field is $\frac{5}{64}$ mi. What part of a mile is the diagonal of another square field, whose area is four times as great?

24. Find the diagonal of a cubical block each of the edges of which is 20 inches.

MISCELLANEOUS PROBLEMS

1. What is the capacity of the largest container that will exactly measure 1,596, 2,052, or 3,591 gallons of petroleum?

2. A travels at the rate of $259\frac{7}{8}$ mi. in $6\frac{3}{10}$ da., and B at the rate of $273\frac{3}{8}$ mi. in $6\frac{3}{4}$ da. If they start from the same place and travel in opposite directions, how far apart will they be at the end of $16\frac{2}{3}$ da.?

3. A bin contained 8 bu. 2 pk. of oats. How many quarts did it contain?

4. A railway train running at the average rate of 34 mi. 68 rd. 4 yd. 2 ft. per hour, went from A to B in 9 hr. What is the distance between the two places?

5. If 80 cu. yd. 4 cu. ft. 848 cu. in. of earth were removed in 28 equal loads, how much did each load contain?

6. How many piles of wood, each containing 2 cd. 75 cu. ft., can be made from 93 cd. 12 cu. ft.?

7. Reduce 2 mi. 180 rd. 3 yd. 2 ft. 10 in. to inches.

8. Reduce 87,889 in. to higher denominations.

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9. How many revolutions will a carriage wheel, whose circumference is 14 ft. 8 in., make in going 2 mi. 84 rd.?

10. What is the area of the smallest tract of land that can be divided into farms of 60, 64, 80, or 96 acres each?

11. A circular race track has a circumference of 400 rd. What is its diameter?

12. If the remainder is 176, the quotient 349, and the dividend 1,037,404, what is the divisor?

13. A mill employed 1,765 workers who received on the average $1.75 a day. As the result of a strike, the wages were increased 15%. Find the amount of the new weekly payroll.

14. The amount raised from a $2\frac{1}{4}\%$ tax was $731,250. What was the assessed valuation of the property?

15. Goods listed at $2,500 were sold at a discount of 25, 10, and 4%. Find the net price.

16. Find the cost at $6.85 a square (100 sq. ft.) of slating a roof 60 ft. long, and 18 ft. wide on each side.

17. A room 27 ft. wide requires 180 yd. of carpet, $\frac{3}{4}$ yd. wide, running lengthwise. Find the length of the room.

18. How many acres in a field in the form of a rhombus, each side measuring 64 rd., and the perpendicular between opposite sides 47 rd.?

19. How many thousand feet of lumber will inclose the four sides of a building 80 ft. long, 45 ft. wide, and 24 ft. high to the eaves making no allowance for openings.

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20. A man sold a horse for $135\frac{5}{10}$, thereby gaining $15\frac{1}{2}$. How much would he have gained had he sold him for $150\frac{3}{4}$?

21. Find the cost of $19\frac{3}{4}$ doz. eggs at $.24 a dozen, $24\frac{1}{2}$ lb. of flour at $.04\frac{1}{8}$ a pound, $17\frac{1}{2}$ lb. starch at $.06\frac{3}{8}$ a pound. How much change should be received from $10.00 given in payment for these articles?

22. A merchant purchased 145 yards of oilcloth at $.46 a yard. He sold .70 of it for .95 of the entire cost. What did he receive per yard for what he sold?

23. On a field of 27.25 A., the average production of potatoes was 60.5 bushels to an acre. How much was received for the entire crop which was sold at $.45 a bushel?

24. Two racers started at 1:40. The winner returned to the starting point at 3.56 having averaged 27 miles an hour. How far did he travel?

25. A and B start from the same point and travel in the same direction at the rate of $6\frac{1}{2}$ miles and $7\frac{1}{4}$ miles an hour respectively. If B starts $1\frac{1}{2}$ hours after A, how far apart are they $4\frac{1}{3}$ hours after A starts?

26. A field of 24 acres produced 27 bu. of wheat per acre. Each bushel of wheat made 48 lb. of flour. If the flour sold at $5.25 per barrel, what was the value of the crop?

27. A peddler buys peaches at the rate of 5 cents a dozen and sells them at the rate of 5 for 3 cents. How many dozen must he buy and sell to make $4.40?

28. A cistern will hold 7,800 gal. If it receives 857 gal. per hour by one pipe, and discharges 12.8 gal. per minute by another, in what time will it be filled?

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29. A coal dealer purchased 148 tons of coal by the long ton (2,240 lb.) at $4.25 per ton, and sold it by the short ton (2,000 lb.) at $6.80 per ton. What was his profit?

30. A boy who owned some hens paid an average of $1.36 per month for six consecutive months for their food. During that time he collected an average of 7 eggs a day which he sold for $.25 per dozen. Allowing 30 da. to a month, how much did he gain during the six months?

31. A boy rode 25¼ mi. on a bicycle in 2⅜ hr. At the same rate, how far could he ride in 3⅓ hr.?

32. Make out a receipted bill for 36 yd. of carpet at $1.25 per yd., 2 rugs at $37.50 each, 25 yd. of linoleum at $1.48 a yd., and 28 yd. of matting at $.75 per yd.

33. A farmer sowed 27½ A. to wheat, 19¾ A. to oats, 3⅝ A. more to clover than to wheat and oats, and 9¼ A. less to barley than to wheat. How many acres did he sow?

34. Two vessels are on opposite sides of the Pacific Ocean, 9,775 miles apart. They sail towards each other, one at the rate of 275 mi. per day, and the other 296 mi. per day. In how many days will they meet?

35. A quantity of meat was sold for $10,548.50, at a gain of $1,589.50. If the selling price was $18.25 per bbl., what did it cost per pound, allowing 200 lb. to a barrel?

36. If 490 A. of farm land, worth $75 an acre, were exchanged for 712 A. of woodland and $2,574 in money, what was the value of the woodland an acre?

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37. A clerk sold 15 yards of cloth at \$1.38 a yard, 9 yards of silk at \$.98 a yard, 24 yards of lace at \$.12½ a yard, and 7 yd. of ribbon at \$.35 a yard. How much change should he return to the purchaser who gave him \$40.00 in payment?

38. A rectangular section of land contains 462,002 acres and measures on one side 1,001 rd. How many rods long is the other side?

39. A house which was purchased for \$2,575 rents for \$25 a month. The taxes, insurance and repairs amount to an average of \$94 annually. What % of the investment does the owner receive?

40. A grocer sold apples at 8 cents a quart for which he had paid \$3.00 a barrel (2½ bushels). What was his gain per cent?

41. A man willed \$25,000 to each of his two sons. One son invested his money in 6% stock which he purchased at a premium of 25%. The other loaned his money at 5½% interest. Which was the better investment, and how much better?

42. A pupil who attended school 68 days during a term was marked 85% for attendance. How many days was he absent?

43. Two successive discounts of 15% and 10% reduced a bill to \$489.60. What was the original bill?

44. A house worth \$18,000 was insured for ¾ its value by three companies. The first took ⅓ of the risk at ⅓%, the second ⅜ of the risk at ¼%, and the third the remainder at ⅜%. What was the whole premium paid?

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45. A merchant marks an article $6, but by selling it at a discount of 10% for cash he gains 20%. Find the cost of the article.

46. Make a receipted bill of the following: John Williams bought of Taylor & Co. January 3, 1901, 25 planks 10 ft. long, 8 in. wide and $1\frac{1}{2}$ in. thick, at $16 per M.; January 17, 12 sticks of timber 28 ft. long and 8 in. square at $30 per M.

47. Simplify $\left(\frac{\frac{3}{4}-\frac{2}{3}}{\frac{7}{8}-\frac{3}{4}}+\frac{4}{5}+\frac{3}{5}\times\frac{5}{9}\right)\div 7$.

48. How many entire building lots, each 50 ft. by 100 ft., can be made from $2\frac{1}{2}$ A. of ground?

49. A man walks $8\frac{3}{4}$ mi. in 2 hr. 20 min. How long will it take him to walk $11\frac{1}{3}$ mi.? (Solve both by analysis and proportion.)

50. An agent's commission of $2\frac{1}{2}\%$ is $47.85. What amount must be sent him to cover both his commission and the sum invested?

51. A house and lot cost $5,000. The insurance is $25, taxes are $50, and repairs are $75 annually. What rent must be received to realize 6% on the investment?

52. A field in the form of a trapezoid is 32 rd. long, and its two parallel ends are 16 rd. and 24 rd. wide. Find its area in acres.

53. A farm having the shape of a trapezoid measures 85 rd. and 79 rd. along its parallel sides, and is 104 rd. long. Find its value at $75 an acre.

54. How much tax will a farmer have to pay who is assessed for 275 acres of land at $18 per acre, and for $2,500 personal property, the tax rate being $5\frac{1}{2}$ mills on the dollar, and the fee for collecting being 1%.

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55. A man was offered $3,500 for his home, but he refused to sell as he would thereby lose 12½%. Later he sold the house for $4,800. Did he gain or lose and how much?

56. If one bushel of wheat will make 40 lb. of flour, how many barrels of flour can be made from the contents of a bin full of wheat, the dimensions of the bin being 10 ft. by 5 ft. by 4 ft.?

57. How much will it cost to plaster the walls and ceiling of a room 27 ft. long, 15 ft. wide, and 12 ft. high, at 25 cents a square yard, allowing 432 sq. ft. for doors and windows?

58. Find the cost, at $1.25 a double roll, of plain paper for the walls and ceiling of a room 24 ft. long and 16 ft. wide, the strips for the sides being 8 ft. in length.

59. What will it cost, at $.75 a yard, to cover the floor of a room 18 ft. 6 in. by 14 ft. 9 in. with carpet 1 yd. wide, if the strips run lengthwise and ⅛ yd. is allowed on every strip except the first for matching the pattern?

60. In a certain municipality the valuation of the taxable property was $325,489,250, and the amount to be raised by taxation $7,811,742. What was the tax of a resident who owns a house and lot assessed at $4,580?

61. A broker invested in 40 shares of stock, par value $50, at 2½% discount. He sold ¼ of it at ½% discount, and the rest at 1¼% premium. What was his gain?

62. A granite rectangular column stands 15 ft. 6 in. high, and has a base 1 ft. 6 in. square. What did it cost, at $7.25 a cubic foot?

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63. A statue rests on a marble base which has a circumference of 12.5664 ft. and is 2 ft. 3 in. high. Find the number of cubic feet of marble in the base.

64. A man raised $962.85 by having his note for 3 months discounted at a bank at 7%. For what sum was the note drawn?

65. A merchant sends $10,246.50 to his agent to invest in flour after deducting 3½% of the sum invested for his commission. How many barrels of flour can he buy at $5.50 a barrel?

66. A man bought 227 pounds of butter at $.198 a pound and paid the bill with the proceeds of a bank note for 60 days at 6%. Find the face of the note.

67. A peddler purchased lemons at $.75 a hundred. 7% of them decayed. What per cent of profit did he make by selling the remainder at the rate of 3 for 5 cents?

68. A real estate agent sold a piece of property for 15% less than he first asked for it and received $2,550. If the price which he asked included a 25% profit, what was the cost of the house?

69. An agent purchased grain at a commission of ⅜% and received $480 commission. Later he sold the grain for $3,800 more than the original cost. How much did he remit after deducting his commission of 1¼% for selling?

70. If A can do a piece of work in 6 days and B can do the same work in 8 days, how long will it take B to finish after they have worked together two days?

71. A and B entered into partnership. A furnished $300 for 8 mo., and B $600 for 5 mo. They lost $108. How much did each man lose?

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72. The expenses of an entertainment for charity were 35% of the receipts. After paying all bills, the management sent checks for $611.00 to each of five different charity organizations. What were the expenses of the entertainment?

73. Simplify $\frac{\frac{8}{10} \div (\frac{1}{6} + \frac{3}{10} + \frac{11}{15})}{(1\frac{5}{8} \times 3\frac{3}{4}) - (5\frac{1}{4} \div 1\frac{2}{3})}$.

74. A square lot has an area of 44,521 square feet. What will it cost to enclose the lot with a wire fence at 33 cents a rod?

75. A goat tethered to a post by a rope 19 ft. long can reach 2 ft. beyond the end of the rope. Over how many square yards of ground can the goat graze?

76. A man pays $105 once in 3 yr. for insuring his house at $\frac{1}{4}$% annually. Find the amount for which the house is insured.

77. Find the cost of 20 joists, each 4 in. by 6 in. and 16 ft. long at $22 per M.

78. A man sold 500 acres of land, receiving in payment $\frac{3}{5}$ of the value in cash, and the rest in a note due in 3 mo. without interest. He immediately discounted the note at a bank at 6%, paying $57.50 discount. What was the price of the land per acre?

79. Reduce to the higher denominations (*a*) 69,875 cubic inches; and (*b*) 233 pints (dry measure).

80. If a ladder placed 8 ft. from the base of a building 40 ft. high, just reached the top, how far must it be placed from the base of the building that it may reach a point 10 ft. below the top?

81. The circular space under the dome of a church is 56 ft. in diameter. Find the cost of paving it with marble tiles, at $.32 a sq. ft.

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82. A man paid \$6,450 for a farm, and spent on improvements a sum equal to 60% of the purchase price. He then sold the farm for \$11,868. What was the gain per cent on the whole cost?

83. A city purchased a park in the form of a right-angled triangle paying \$720, at \$75 an acre. If the altitude was 48 rd. long, what was the length of each of the other sides?

84. After diminishing a certain number by $\frac{2}{3}$ of itself and the remainder by $\frac{3}{11}$ of itself, the remainder is 45. Find the number.

85. I buy goods at a discount of 25% from the list price and sell at the list price. What % profit do I make?

86. In a dome-shaped structure a rope 58 ft. long extends in a straight line from the central point of the ceiling to the edge of the floor. The distance from this central point to the center of the floor is 42 ft. Find the circumference of the floor.

87. Find the proceeds of a note for \$350, without interest, dated May 1, 1897, payable in 4 months and discounted July 16, at 5%.

88. Find the product of the two numbers whose sum is 926 and whose difference is 208.

89. If \$8,000 worth of $4\frac{1}{2}$% stocks are sold at $87\frac{1}{2}$, and the proceeds are invested in 6% stock at $116\frac{2}{3}$, what will be the change in the annual income?

90. How many rods long is a square field containing 10 acres? Find the cost of inclosing the field with wire fencing at \$.$12\frac{1}{2}$ a foot.

91. What must be the circumference of a cylindrical tank 7 ft. deep in order to hold 83.5584 barrels?

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92. A, B and C together have \$250. B has $\frac{3}{5}$ as much as A, and C has $\frac{1}{4}$ as much as A and B together. How much has each?

93. Find the entire surface of a cylinder 5.4978 ft. in circumference, and 3 ft. 8 in. high.

94. Find the amount of ice cream contained in a cone whose base is 7.854 in. in circumference and whose altitude is 8 in.

95. How much material is needed for covering 100 balls, each 10 in. in diameter?

96. James plowed $8\frac{2}{3}$ acres of land while Henry was plowing $7\frac{3}{4}$ acres. When James had plowed $43\frac{1}{3}$ acres, how much land had Henry plowed?

97. Three fields were equal in size. The first yielded an average of $27\frac{1}{2}$ bushels of grain to an acre; the second, $35\frac{2}{3}$ bushels; the third, $29\frac{3}{4}$ bushels. The total yield was $1{,}672\frac{1}{2}$ bu. What was the size of each field?

98. The interior of a spherical globe is 20 in. in diameter. How many gallons will it contain?

99. The diameter of the circle whose circumference forms the outer edge of a walk is 50 ft., and that of the circle whose circumference forms the inner edge is 40 ft. Find the number of square feet in the walk.

100. If in selling cloth, $\frac{3}{4}$ of the gain equals $\frac{3}{16}$ of the selling price, for how much will $3\frac{1}{3}$ yd. sell that cost \$5 per yd.

101. A and B invest equal sums in business. A gained a sum equal to 25% of his stock and B lost \$225. A's money at that time was double that of B's. What amount did each invest?

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Linear Measure

12 inches (in.)	= 1 foot (ft.)
3 feet	= 1 yard (yd.)
5½ yards or 16½ feet	= 1 rod (rd.)
320 rods or 5280 feet	= 1 mile (mi.)

Square Measure

144 square inches (sq. in.)	= 1 square foot (sq. ft.)
9 square feet	= 1 square yard (sq. yd.)
30¼ square yards	= 1 square rod (sq. rd.)
160 square rods	= 1 acre (A.)
640 acres	= 1 square mile (sq. mi.) or section (sec.)
36 sections	= 1 township (T.)

Cubic Measure

1728 cubic inches (cu. in.)	= 1 cubic foot (cu. ft.)
27 cubic feet	= 1 cubic yard (cu. yd.)
128 cubic feet	= 1 cord (cd.)

Avoirdupois Weight

16 ounces (oz.)	= 1 pound (lb.)
2000 pounds	= 1 ton (T.)
2240 pounds	= 1 long ton.
100 pounds	= 1 hundredweight (cwt.)

Troy Weight

24 grains (gr.)	= 1 pennyweight (pwt.)
20 pennyweights	= 1 ounce (oz.)
12 ounces	= 1 pound (lb.)

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Apothecaries' Weight

20 grains (gr.)	= 1 scruple (sc.)
3 scruples	= 1 dram (dr.)
8 drams	= 1 ounce (oz.)
12 ounces	= 1 pound (lb.)

Liquid Measure

4 gills (gi.)	= 1 pint (pt.)
2 pints	= 1 quart (qt.)
4 quarts	= 1 gallon (gal.)
31½ gallons	= 1 barrel (bbl.)
63 gallons	= 1 hogshead (hhd.)

1 gallon contains 231 cubic inches.

Dry Measure

2 pints (pt.)	= 1 quart (qt.)
8 quarts	= 1 peck (pk.)
4 pecks	= 1 bushel (bu.)

A bushel contains 2150.42 cubic inches.

1 quart dry measure is about the same as 1⅛ quarts liquid measure.

Time

60 seconds (sec.)	= 1 minute (min.)
60 minutes	= 1 hour (hr.)
24 hours	= 1 day (da.)
7 days	= 1 week (wk.)
365 days	= 1 common year (yr.)
366 days	= 1 leap year.

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Arc and Angle Measure

60 seconds (″)	= 1 minute (′)
60 minutes	= 1 degree (°)
An arc of 360°	= 1 circumference

Counting

12 units	= 1 dozen (doz.)
12 dozen	= 1 gross (gr.)
12 gross	= 1 great gross
20 units	= 1 score

Paper

24 sheets	= 1 quire
20 quires	= 1 ream
2 reams	= 1 bundle
5 bundles	= 1 bale.

United States Money

10 mills	= 1 cent (ct. or ¢)
10 cents	= 1 dime (d.)
10 dimes	= 1 dollar ($)
10 dollars	= 1 eagle (E.)

English Money

4 farthings	= 1 penny (d.)
12 pence	= 1 shilling (s. or /)
20 shillings	= 1 pound (£) or sovereign.

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DEFINITIONS

Note: The following definitions are given as an aid to the pupil in finding the meanings of arithmetical terms. Only those should be memorized which the teacher may deem necessary.

Abstract Number (Find under *Number*).

Accurate Interest is interest computed for exact time in days, counting 365 days to the year.

Addends are numbers added.

Addition is the process of combining numbers into one number called their sum.

An **Agent** is a person who is given power to transact business for another person called the principal.

An **Aliquot Part** of a number is an exact divisor of that number.

The **Amount** is the sum of the principal and the interest.

The **Antecedent** is the first term of a ratio.

Area is the measure of a surface expressed in square units.

Assets are the property of a person, a firm or a corporation.

Average is the quotient obtained by dividing the sum of two or more numbers by the number of addends.

Bank Discount is interest which is paid in advance on a note.

Base is the number a per cent of which is taken.

A **Bill** is a written statement of goods sold, or of services rendered with the price or charge.

Bond (Find under *Note*).

A **Broker** is an agent who buys or sells for his principal without having possession of the goods.

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Brokerage is the sum paid a broker for his services.

Cancellation is the process of removing a common factor from both terms of a fraction or from both the divisor and the dividend in an example in division.

Capacity (Find under *Volume*).

Capital Stock (Find under *Stocks*).

A **Check** is a written order directing a bank to pay money.

Commercial Discount (See *Trade Discount*).

Commission is the sum paid an agent for his services.

A **Commission Merchant** is an agent who buys or sells goods for another. He has possession of the goods.

A **Common Denominator** is one which is common to two or more fractions.

A **Common Divisor** is an exact divisor of two or more numbers.

A **Common Factor** or **Common Measure** is the same as a common divisor.

A **Common Multiple** of two or more numbers is a number exactly divisible by each of them.

Complex Fraction (Find under *Number*).

A **Composite Number** is one that can be factored.

Compound Interest is interest on the principal and its unpaid interest computed at stated intervals.

Concrete and Compound Numbers (Find under *Number*).

The **Consequent** is the second term of a ratio.

A **Consignee** is one to whom something is consigned or shipped.

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A **Consignor** is one who consigns or ships something to another.

A **Corporation** is a company of persons authorized by law to transact a specified business.

A **Coupon** is a note attached to a bond promising to pay interest on the bond when due.

A **Creditor** is one to whom money is due.

A **Cube** is a solid having six equal, square faces or sides.

The **Cube of a Number** is the product obtained by taking the number three times as a factor.

The **Cube Root** of a number is one of its three equal factors.

Customs (See *Duties*).

Date of Maturity is the date on which a note falls due.

A **Debtor** is a person who owes a debt.

A **Decimal Fraction** (Find under *Number*).

Denominate Number (Find under *Number*).

Denominator of a Fraction (Find under *Number*).

A **Diagonal of a Polygon** is a straight line connecting two of its non-adjacent angles.

The **Diameter of a Circle** is a straight line drawn from the circumference through the center to its opposite side.

The **Difference** is the result found by subtracting one number from another.

Discount (See *Bank* and *Trade Discount*).

The **Dividend** in division is the number to be divided. (See also under *Stock*.)

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Division is the process of finding how many times one number is contained in another.

A **Divisor** is the number by which the dividend is divided.

A **Draft** is a check drawn by one bank on another bank, or a written order by one person on another directing the payment of a specified sum of money.

The **Drawee** of a draft is one ordered to pay the draft.

The **Drawer** of a draft is the one who makes the draft.

Duties are taxes on goods imported into a country.

An **Even Number** is one that is exactly divisible by 2.

Evolution is the process of finding a required root of a given number.

Exchange is a system of making payments or collections by orders or drafts.

An **Exponent** is a figure placed at the right and a little above a number to show how many times it is to be taken as a factor.

The **Extremes** of a proportion are its first and fourth terms.

The Face of a Note is the amount of money named in the note.

The **Factors** of a number are numbers whose product is that number.

Fraction (Find under *Number*).

The **Greatest Common Divisor**, or Greatest Common Measure of two or more numbers is the greatest number that is exactly contained in each of them.

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To **Indorse** is to write one's name across the back of a note, check, or draft.

An **Indorser** is one who indorses a note, check, or draft.

Insurance is indemnity against loss or damage.

An **Integer** is a number which express whole units.

Interest is the sum paid for the use of money.

Involution is the process of taking a number as a factor a given number of times.

The **Least Common Multiple** of two or more numbers is the least number exactly divisible by each of them.

The **Liabilities** are all the debts or obligations of a person, firm or corporation.

Like Numbers are numbers having the same unit.

List Price is the price at which goods are catalogued or listed. They may be sold below this price, that is, at a discount from list price. The actual selling price is called the **Net Price.**

Lowest Terms. A fraction is reduced to its lowest terms when no integer will exactly divide each of its terms.

The **Maker of a Note** is the one who signs the note.

The **Market Value** is the price at which goods, property, stocks, or bonds sell.

Maturity of a Note (See *Date of Maturity*).

The **Means** of a proportion are its second and third terms.

The **Minuend** is the number from which another number is subtracted.

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A **Mixed Number** is a number composed of a whole number and a fraction.

A **Multiple** of a number is a number that will exactly contain that number.

Multiplication is the process of taking a number as many times as there are units in another.

The **Multiplicand** is the number to be multiplied.

The **Multiplier** is the number by which another number is multiplied.

Net Price (Find under *List Price*).

Net Proceeds (Find under *Proceeds*).

Notation is a system of writing numbers. **Arabic Notation** is a system of writing numbers by the use of figures. **Roman Notation** is a system of writing numbers by the use of letters.

A **Note** is a written promise to pay a stated sum of money on demand, or at a stated time. A note is often called a **promissory** note. **Bonds** are notes issued by corporations or governments.

Number is that which tells how many units or parts of units are contained in a quantity. An **Abstract Number** is a number expressed without the name of the unit of measure. A **Concrete Number** is one expressed with the unit of measure. A **Denominate Number** is a concrete number, the unit of which is a standard of measure. A **Compound Number** is a denominate number whose value is expressed in two or more related units.

A **Fraction** is a number which expresses one or more equal parts of a unit.

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A **Common Fraction** is a fraction both terms of which are expressed by figures.

A **Decimal Fraction** or **Decimal** is a fraction the denominator of which is 10, or a power of 10. The denominator is not written.

The **Denominator** of a fraction shows the number of equal parts into which the unit is divided.

The **Numerator** of a fraction shows the number of equal parts taken.

A **Proper Fraction** is one whose numerator is less than the denominator.

An **Improper Fraction** is one whose numerator equals or exceeds the denominator.

A **Complex Fraction** is one having a fraction in one or both of its terms.

Numeration is reading numbers.

An **Odd Number** is a number that is not exactly divisible by 2.

Par Value is the face value of stocks or bonds.

A **Partial Payment** is a payment of a part of a note or other debt.

Payee is the one to whom a note, check, or draft is to be paid.

Per Cent means by the hundred.

Percentage is the result obtained by taking a given per cent of a number called the base.

The **Perimeter** of a polygon is the distance around it.

A **Policy** is a written contract to pay insurance in case of loss.

A **Poll Tax** is a tax levied upon persons instead of upon property.

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A **Power** is the product of two or more equal factors.

A **Premium** is the sum paid for insurance for a specified time.

A **Prime Number** is one that has no exact divisor except itself and 1.

Numbers are **Prime to Each Other** if they have no common exact divisor.

Principal is the money on which interest is computed.

The **Proceeds** of a Collection or of a Sale. The **Gross Proceeds** is the entire amount received. The **Net Proceeds** is the amount remaining after all expenses of the transaction, including Commission, have been deducted from the Gross proceeds.

The **Proceeds of a Note** is the amount left after deducting the discount.

The **Product** is the result obtained in multiplication.

Proportion is an expression of equality of ratios.

The **Quotient** is the number which shows how many times one number is contained in another.

A **Radius** is a straight line from the center to the circumference of a circle.

Rate is the number of hundredths of the base to be taken.

Ratio is the relation between two numbers and is determined by dividing the first number by the second.

The **Reciprocal** of a fraction is the fraction inverted.

Resources include all property owned by or owed to a person, firm or corporation.

A **Root** is one of the equal factors of a number.

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The **Square** of a number is the product obtained by taking the number twice as a factor.

The **Square Root** of a number is one of the two equal factors of that number.

Stock or **Capital Stock** is a name given to the capital of a company or corporation. A **Share** is a part into which the stock is divided. A **Stockholder** is an owner of shares. A **Certificate of Stock** is a written statement telling the number of shares owned by a stockholder and their par value. A **Dividend** is the part of the profits which a company pays on each share of stock. Stock sold for more than its par or face value is sold at a **Premium**; for less than its par value, at a **Discount.**

Subtraction is the process of finding the difference between two numbers. The **Minuend** is the larger number. The **Subtrahend** is the smaller number.

The **Sum** is the result obtained by adding numbers.

Taxes are sums levied by a government for public purposes.

The **Terms of a Fraction** are its numerator and denominator.

The **Terms of a Proportion** are the extremes and the means.

Trade or **Commercial Discount** is an amount deducted from a list price, a bill of goods or from a sum of money to be paid.

Volume is the measure of a solid expressed in cubic units. The measure of a receptacle is called its **Capacity.**

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INTRODUCTORY NOTE: The examinations given by the Regents of New York State are considered as standard tests of efficiency in arithmetic. The following examinations have been given from January 1911 to January 1914 inclusive. Question one of each set of questions is an example in addition of either five or six columns and twenty items, together with one or two equally difficult examples in subtraction, multiplication or division.

Tuesday, January 17, 1911—9:15 a.m. to 12.15 p.m., only.

Answer question 1 and nine others. All operations necessary to find results must be given; simply indicating the operations is not sufficient. Reduce each result to its simplest form.

1. See Introductory Note.

2. Find the least common multiple of 26, 104, 156, 78.

3. If a boy rides 23⅜ miles on a bicycle in 2¾ hours what is his rate per hour?

4. A family purchases 47⅝ lb. of meat per month at an average price of $.167 per pound; if other foods are substituted for the meat at an average cost of $5.23 per month, how much money will be saved thereby in a year?

5. How many yards of carpet 27 inches wide will be required for a hall 11 ft. 3 in. wide and 64 ft. long, if the strips run lengthwise and there is no waste in matching? What will the carpet cost at $1.50 per yard? *Or*

Write the table (*a*) of dry measure, (*b*) of square measure, (*c*) of avoirdupois weight.

6. A dealer buys 320 yards of cloth at 87½ cents a yard; at what price per yard must he sell the cloth to make a profit of $40?

7. Write a promissory note for $900, dated January 1, 1901, payable without interest to John Smith three months after date. *Or*

Find the bank discount on a note for $900, dated January 1, 1901 and payable in three months without interest, if discounted February 20, 1901 at 5%.

8. What is the commission on 87 tubs of butter, each containing 50 lb., if sold at 27 cents a pound, commission 3½%?

9. Reduce the decimal fractions .875, .3125 and .06¼ to common fractions in their lowest terms.

10. The assessed valuation of a certain district is $3,250,000; the amount to be raised by tax is $8125. What is the rate of taxation and what is the tax of a man whose property is assessed at $50,000?

11. What is the interest on $825 from May 16, 1910 to February 21, 1912 at 5½%? *Or*

A square lot has an area of 6889 sq. ft.; how many feet long is one side?

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Tuesday, June 13, 1911—9:15 a.m. to 12:15 p.m., only.

Answer question 1 and nine other questions. No credit will be allowed unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient. Reduce each result to its simplest form.

1. See introductory note, page 194.

2. Define *five* of the following: factor, prime factor, denominate number, proper fraction, trapezoid, bank discount.

3. *a.* Express in figures one million one thousand fifty-six and four hundred twenty-five hundred-thousandths.

   b. Express 1911 in Roman notation.

4. *a.* From $96\frac{3}{7}$ subtract $78\frac{3}{4}$ *b.* Multiply $75\frac{3}{4}$ by $25\frac{3}{7}$ *c.* Divide 225 by $18\frac{3}{4}$ *d.* Divide $25\frac{3}{4}$ by $16\frac{2}{3}$

5. The cost of food purchased for 12 hens for the six months from April 1 to October 1 was $1.48 per month; during that entire period the owner collected on an average 7 eggs a day; these eggs were sold at $24\frac{1}{2}$ cents per dozen. Allowing 30 days to the month, how much money was gained by keeping the hens?

6. *a.* Write the table of (1) time measure, (2) liquid measure.

   b. If a cubic yard of earth weighs $2787\frac{1}{2}$ lb. how many tons will 10 cubic yards and 18 cubic feet of earth weigh?

7. At 21 cents a sq. yd. what will be the cost of painting the walls of a kitchen 15 ft. long by 12 ft. wide by 9 ft. 4 in. high?

8. Find the simple interest at 5% on a note for $5375 dated Sept. 15, 1905 and payable June 12, 1911.

9. A grocer bought 625 dozen pound packages of a certain food for $900, less $16\frac{2}{3}$% discount; he sold each package for 16 cents. How much did he gain in all?

10. *a.* The triangular gable of a house has a base 13 ft. and an altitude $10\frac{1}{2}$ ft.; find the area of the triangle.

    b. Compute the cost of fencing a field 58 rd. $12\frac{1}{2}$ ft. long and 39 rd. wide, if the fence costs $3.25 per rd.

11. *a.* In a certain quantity of milk the ratio of the cream to the rest of the milk is as 2 to 9; how many pounds of cream are there in 253 pounds of the milk?

    b. The inside dimensions of a car are 36 ft. by 8 ft. by 4 ft.; find the cost of a car load of oats at 31 cents per bu.

12. Make out and receipt a bill for the following: Ford Travis bought of Welch & Co. 41 lb. of butter at 38 cents a lb.; 3 bu. of potatoes at 87 cents a bu.; 12 bars of soap at $6\frac{1}{4}$ cents a bar; $3\frac{1}{4}$ lb. of prunes at 20 cents a lb.

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Tuesday, January 16, 1912—9:15 a.m. to 12:15 p.m., only.

Answer question 1 and nine other questions. No credit will be allowed unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient. Reduce each result to its simplest form and mark each answer Ans.

1. See introductory note, page 194.

2. Write in words *each* of the following: (*a*) 90,909, (*b*) 125.00036, (*c*) $149\frac{24}{49}$, (*d*) 500,000,000, (*e*) XCIV.

3. A farmer sold 200 bushels of potatoes at 75 cents a bushel, 10 dozen eggs at 24 cents a dozen and 40 pounds of butter at 30 cents a pound; he invested $\frac{2}{5}$ of the proceeds in coal and deposited the balance in the bank. How much money did he deposit?

4. *a.* Reduce $\frac{189}{847}$ to its lowest terms.
   b. Express .625 and .0625 as common fractions in their lowest terms.

5. Perform *each* of the following operations:
   a. $7 \times \frac{5}{8}$
   b. $19 \div \frac{3}{4}$
   c. $\frac{5}{8} \times \frac{2}{3}$
   d. $\frac{5}{7} \div \frac{5}{8}$
   e. $\frac{3}{17} \div 4$

6. Find the cost, at $25 per thousand, of 100 boards, each 18 ft. long, 8 in. wide and ½ in. thick.

7. A dealer bought 300 tons of ice for $750; he sold the ice at the rate of 25 cents per hundred pounds. Find (*a*) how much he gained, (*b*) what per cent he gained.

8. Charles Jones bought of the George N. Johnson Company an automobile for $4000; he paid $2500 in cash and for the balance gave a promissory note for 3 months, with interest at 5%. Write the note, dating it January 15, 1912.

9. Find, at date of maturity, the interest at 6% on a note for $375, dated June 15, 1907 and payable September 27, 1912.

10. Richard, James and Henry formed a partnership to sell fruit; Richard invested $48, James $60 and Henry $72. If they gained $60 the first week what was each partner's share of the profit?

11. Extract the square root of 44,521.

12. A man purchased a house for $5000; the first year the expense for repairs was $45, for taxes $75, for insurance $10. If the house was rented for $40 a month what per cent did he gain on his investment that year?

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Tuesday, June 18, 1912—9:15 a.m. to 12:15 p.m., only.

Answer question 1 and nine other questions. No credit will be allowed unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient. Reduce each result to its simplest form and mark each answer Ans.

1. See introductory note, page 194.

2. Define (*a*) dividend, (*b*) divisor. Write the following tables: (*a*) square measure, (*b*) avoirdupois weight, (*c*) dry measure.

3. Perform *each* of the following operations:

a. $196\frac{7}{8} - 16\frac{7}{8}$ *d.* 95.5×8.4

b. $1400 \div 16\frac{7}{8}$ *e.* $425.5 \div .05$

c. 125—25.0125

[Two credits will be given for each correct answer.]

4. A lady made purchases as follows: 5 pecks potatoes at \$.35 per peck; ½ dozen eggs at \$.38 per dozen; 2½ lb. meat at \$.18 per lb.; 2 dozen oranges at \$.30 per dozen. She gave a five dollar bill in payment. What change should she receive?

5. If three men can do a piece of work in $9\frac{1}{8}$ days, how long will it take 10 men to do the same work?

6. Divide the product of

$$24 \times 18 \times 36 \times 17 \times 57 \text{ by } 12 \times 34 \times 19 \times 54 \times 9$$

[Solve by cancelation.]

7. Find the total cost of the following loads of coal at \$6.25 per ton: 3849 lb., 2935 lb., 4832 lb., 2364 lb., 2837 lb., 4378 lb., 1352 lb.

8. Find the area of a circle whose circumference is 50.2656 feet.

9. The shorter side of a rectangular field is 30 rd., the diagonal is 50 rd.; find in acres the area of the field.

10. A man bought a horse for \$175 and sold it for \$210; what was his per cent of gain in this transaction?

11. How much interest, at 6%, is due today, June 18, 1912, on a note for \$250, given June 15, 1910?

12. What per cent is realized from an investment of 6% stock at $119\frac{7}{8}$, brokerage $\frac{1}{8}$%?

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Tuesday, January 21, 1913—9:15 a.m. to 12:15 p.m., only

Answer question 1 and nine other questions. No credit will be allowed unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient. Reduce each result to its simplest form.

1. See introductory note, page 194.

2. Solve *a.* $12\frac{2}{3} + 3\frac{3}{4} + 2\frac{7}{15} + 4\frac{2}{5}$ *c.* $6\frac{3}{5} \times \frac{2}{3}$
b. $18\frac{3}{20} - 3\frac{5}{8}$ *d.* $1\frac{7}{8} \div 3\frac{3}{4}$
[2½ credits will be allowed for each correct result.]

3. Define product, factor, quotient, prime number, interest.

4. a. Write in words 4006.6071, 5000.0005, .060042
b. Divide .87 by 870
c. Multiply .145 by 14.5

5. At 11 cents per square foot, find the cost of laying a concrete walk 5 feet wide, along the front and along one side of a corner lot 80 feet long by 60 feet wide. Represent the lot and the walk by a diagram.

6. A cylindric tank is 7 feet in diameter and 10 feet high; how many gallons does it hold? [One gal. = 231 cu in.]

7. A commercial traveler receives a salary of $30 per week and in addition a 3% commission on his sales; if his sales amount to $6000 per month, how much is his income per month? [Assume that there are four weeks in one month.]

8. A 60 day note for $2450, dated December 10, 1912, with interest at 6%, was discounted January 9, 1913 at 6%; find the discount.

9. A farmer desired to grind together oats and barley at the ratio of 3 bushels of oats to 2 bushels of barley; he had 64 bushels of barley. What was the quantity of oats required? [Solve by proportion.]

10. The foot of a 37 foot ladder is 12 feet from the wall of a building against which the top of the ladder rests; if the building stands on level ground, how high does the ladder reach on the wall?

11. A man bought a house and lot for $6835. He repaired the house at a cost of $1250. The house was burned and he received $3575 insurance. He then sold the lot for $4516. Did he gain or lose and how much?

12. The distance around a rectangular field is 192 rods; if the field is 56 rods long, how many acres does it contain?

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Tuesday, June 17, 1913—9:15 a.m. to 12:15 p.m., only.

Answer 10 questions. No credit will be allowed unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient. Reduce each result to its simplest form and mark each answer Ans.

Questions 2 and 4 are given to test the accuracy of the pupil. No credit, therefore, will be allowed if the results are not correct.

1. See introductory note, page 194.

2. Solve *a.* $6\frac{3}{4} + 9\frac{1}{8} + 17\frac{5}{12}$ *c.* $6\frac{2}{3} \times 4\frac{1}{6}$
b. $19\frac{1}{8} - 8\frac{5}{6}$ *d.* $5\frac{1}{8} \div 2\frac{2}{3}$

Solve by cancelation $24 \times 36 \times 144 \times 96 \div 12 \times 18 \times 48 \times 84$
[2 credits will be allowed for each correct result.]

3. Write in words (*a*) $\frac{13}{25}$, (*b*) 153926, (*c*) 201.293
Subtract $\frac{1}{10}$ from .1. Multiply $\frac{8}{10}$ by .3.

4. Change these per cents to equivalent common fractions in their simplest forms, showing all the work: $6\frac{1}{4}\%$, $3\frac{1}{8}\%$, 120%, $\frac{1}{2}\%$, .2%. [2 credits will be allowed for each correct result.]

5. The standing of a seventh grade pupil in arithmetic was as follows: Sept. 89%, Oct. 85%, Nov. 91%, Dec. 85%, Jan. 96%, Feb. 87%, Mar. 89%, Apr. 97%, May 96%, June 88%; what was his average standing for the year?

6. Find the compound interest on $420 for 2 years at 4%, if the interest is compounded semiannually.

7. One side of a square field is 40 rods long; how many acres are there in this field? What will it cost to fence it at 70 cents a rod?

8. A note for $500, without interest, is payable in 90 days; on the day the note is made it is discounted at a bank at 6%. Find the proceeds.

9. A family use $2\frac{1}{3}$ pounds of butter a week for a month of 30 days; at 35 cents a pound, how much will the butter cost?

10. Make a receipted bill for the following: C. A. Bryant bought of Harris, Smith & Co., Troy, N. Y., 37 bu. of oats at $.40; 50 bu. of corn at $.67½; 76 bu. of wheat at $1.04¼; 75 bu. of rye at $1.04; 95 bu. of beans at $4.00; 16 bu. of potatoes at $.95. [Date the bill today.]

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Tuesday, January 20, 1914—9:15 a.m. to 12:15 p.m., only.

Answer question 1 and nine of the others. No credit will be allowed unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient. Reduce each result to its simplest form and mark each answer Ans.

1. See introductory note, page 194.

2. What fractional part of a dollar is *each* of the following: 12½ cents, 16⅔ cents, 5 cents, 33⅓ cents, 75 cents, 10 cents, 37½ cents, 20 cents, 25 cents, 66⅔ cents?

3. Write in figures: (*a*) five hundred seven thousandths, (*b*) three thousand one hundred and six hundredths, (*c*) XLVII, XCIX.

Write in words: (*a*) 45.706, (*b*) 90$\frac{5}{12}$.

4. A tank measuring 24 ft. by 8 ft. by 10 ft. is half full of water; what is the weight of the water in tons? [A cubic foot of water weighs 62½ pounds.]

5. The Empire State Express leaves Buffalo at 1 p.m. and arrives in Albany at 6:57 p.m.; the distance is 296.53 miles. What is the average number of miles per hour made by the train?

6. Mr. Brown sent to a commission firm 480 bushels of potatoes and 500 bushels of beans; the potatoes were sold at 72 cents a bushel and the beans at 98 cents a bushel; the firm charged 2½% commission. What amount was sent to Mr. Brown?

7. A merchant buys a bill of goods amounting to $850, with discounts of 20% and 5%; find the net amount of his bill.

8. On Jan. 1, 1913, William Jones bought of Henry Abel a bill of goods amounting to $500, for which he paid by giving his note due March 15, 1913, with interest at 5%. Write the note. Compute the interest on the note when due.

9. A wire attached to the top of a pole 30 feet high reaches the ground 40 feet from the bottom of the pole; how long is the wire if the pole stands in a level field?

10. A quart of floor varnish will cover a space of 150 square feet; how much will it cost, at $2.80 a gallon, to varnish two floors whose dimensions are one 18 ft. by 15 ft. and the other 15 ft. by 12 ft.?

11. Define *each* of the following: improper fraction, commission, discount, square root of a number, radius.

12. Write the following tables of measures: linear, liquid, avoirdupois, dry.

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ANSWERS

Page 6

1. (a) 363	(c) 517	(e) 493	(g) 367	(i) 550
(b) 459	(d) 485	(f) 555	(h) 629	(j) 524
2. (1) 557	(3) 495	(5) 527	(7) 519	(9) 579
(2) 628	(4) 490	(6) 600	(8) 547	

3. 4942
4. 4942

Page 7

1. 3,819,335
2. 359,985
3. 2,512,935
4. 2,629,512
5. 1,852,120

Page 8

6. 15,250	10. 21,503	14. 120,948	18. 401,216
7. 18,821	11. 16,662	15. 138,090	19. 280,275
8. 14,665	12. 14,253	16. 291,024	20. 428,229
9. 13,861	13. 16,802	17. 534,516	

Page 9

21. 16,773,815
22. 8,576,366
23. 8,194,203
24. 5,780,381
25. 25,003,374

Page 10

26. 1,070,512	32. 481,668	38. 588,844
27. 1,115,397	33. 549,459	39. 565,938
28. 1,151,029	34. 533,793	40. 617,236
29. 1,150,593	35. 602,717	41. 547,876
30. 1,197,308	36. 613,938	42. 583,370
31. 1,194,061	37. 633,938	43. 560,123

Page 11

1. (a) 5,778	(c) 9,730	(e) 6,738	(g) 10,629	(i) 9,435
(b) 7,439	(d) 8,769	(f) 8,053	(h) 7,370	(j) 11,560
2. (a) 17,362	(c) 21,314	(e) 18,322	(g) 22,213	(i) 21,019
(b) 19,023	(d) 20,253	(f) 19,637	(h) 18,954	(j) 23,144
3. (a) 34,485	(c) 38,437	(e) 35,445	(g) 39,336	(i) 38,148
(b) 36,146	(d) 37,376	(f) 36,760	(h) 36,077	(j) 4

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4.	(a) 43,605	(c) 47,557	(e) 44,565	(g) 48,456	(i) 47,262
	(b) 45,266	(d) 46,496	(f) 45,880	(h) 45,197	(j) 49,387
5.	(a) 24,352	(c) 28,304	(e) 25,312	(g) 29,203	(i) 28,009
	(b) 26,013	(d) 27,243	(f) 26,627	(h) 25,944	(j) 30,134
6.	(a) 55,761	(c) 59,713	(e) 56,721	(g) 60,612	(i) 59,418
	(b) 57,422	(d) 58,652	(f) 58,036	(h) 57,353	(j) 61,543
7.	(a) 2,572	(c) 6,524	(e) 3,532	(g) 7,423	(i) 6,229
	(b) 4,233	(d) 5,463	(f) 4,847	(h) 4,164	(j) 8,354
8.	(a) 14,211	(c) 18,163	(e) 15,171	(g) 19,062	(i) 17,868
	(b) 15,872	(d) 17,102	(f) 16,486	(h) 15,803	(j) 19,993
9.	(a) 44,370	(c) 48,322	(e) 45,330	(g) 49,221	(i) 48,027
	(b) 46,031	(d) 47,261	(f) 46,645	(h) 45,962	(i) 50,152
10.	(a) 15,481	(c) 19,433	(e) 16,441	(g) 20,332	(i) 19,138
	(b) 17,142	(d) 18,372	(f) 17,756	(h) 17,073	(j) 21,263

1.	(a) 17,232	(c) 13,433	(e) 16,895	(g) 19,032	(i) 18,373
	(b) 16,166	(d) 11,224	(f) 18,245	(h) 17,157	(j) 13,762
2.	(a) 10,722	(c) 6,923	(e) 10,385	(g) 12,522	(i) 11,863
	(b) 9,656	(d) 4,714	(f) 11,735	(h) 10,647	(j) 7,252
3.	(a) 6,513	(c) 2,714	(e) 6,176	(g) 8,313	(i) 7,654
	(b) 5,447	(d) 505	(f) 7,526	(h) 6,438	(j) 3,043
4.	(a) 27,447	(c) 23,648	(e) 27,110	(g) 29,247	(i) 28,588
	(b) 26,381	(d) 21,439	(f) 28,460	(h) 27,372	(j) 23,977
5.	(a) 19,203	(c) 15,404	(e) 18,866	(g) 21,003	(i) 20,344
	(b) 18,137	(d) 13,195	(f) 20,216	(h) 19,128	(j) 15,733
6.	(a) 13,551	(c) 9,752	(e) 13,214	(g) 15,351	(i) 14,692
	(b) 12,485	(d) 7,543	(f) 14,564	(h) 13,476	(j) 10,081
7.	(a) 37,323	(c) 33,524	(e) 36,986	(g) 39,123	(i) 38,464
	(b) 36,257	(d) 31,315	(f) 38,336	(h) 37,248	(j) 33,853
8.	(a) 28,250	(c) 24,451	(e) 27,913	(g) 30,050	(i) 29,391
	(b) 27,184	(d) 22,242	(f) 29,263	(h) 28,175	(j) 24,780
9.	(a) 13,721	(c) 9,922	(e) 13,384	(g) 15,521	(i) 14,862
	(b) 12,655	(d) 7,713	(f) 14,734	(h) 13,646	(j) 10,251
10.	(a) 46,682	(c) 42,883	(e) 46,345	(g) 48,482	(i) 47,823
	(b) 45,616	(d) 40,674	(f) 47,695	(h) 46,607	(j) 43,212

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1. 8,839
2. 45,078
3. 84,759
4. 14,997
5. 63,700
6. 9,768
7. 26,675
8. 24,573
9. 3,889
10. 8,986
11. 35,788
12. 37,470
13. 3,847
14. 19,699
15. 16,368
16. 4,591
17. 19,594
18. 27,069
19. 6,312
20. 5,997
21. 15,128
22. 8,098
23. 16,056
24. 8,059
25. 6,985
26. 8,929
27. 374,305
28. 105,070
29. 80,457
30. 10,607
31. 501,014
32. 80,506
33. 73,334
34. 480,108
35. 243,212
36. 554,123
37. 61,293
38. 87,546
39. 404,358
40. 58,976
41. 30,291
42. 79,320
43. 78,602
44. 28,679
45. 456,789
46. 40,547,656
47. 169,876
48. 3,450,124
49. 24,121,089
50. 19,102,948

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26. 228
27. 1,241
28. 456
29. 735
30. 1,620
31. 752
32. 546
33. 1,235
34. 950
35. 1,960
36. 1,885
37. 2,133
38. 1,512
39. 1,742
40. 1,457
41. 3,002
42. 2,484
43. 2,516
44. 3,040
45. 1,862
46. 3,870

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47. 3,886
48. 4,928
49. 4,425
50. 3,078
51. 4,623
52. 3,283
53. 3,604
54. 6,860
55. 4,992
56. 4,774
57. 7,654
58. 7,569
59. 8,712
60. 7,680
61. 9,506
62. 9,310
63. 10,000
64. 11,663
65. 114,002
66. 99,974
67. 214,320
68. 282,690
69. 362,700
70. 501,993
71. 551,310
72. 390,642
73. 335,434
74. 780,444
75. 896,103
76. 3,710,386
77. 8,994,816
78. 31,553,973
79. 48,649,844
80. 71,067,414
81. 66,513,996
82. 94,899,955
83. 462,007,143
84. 298,711,616
85. 880,093,183
86. 975,898,040
87. 2,403,870,581
88. 323,667,466
89. 401,628,000
90. 1,428,665,010
91. 2,003,620,806
92. 3,191,038,432
93. 3,458,571,684
94. 4,126,696,673
95. 3,587,513,256
96. 3,782,811,901
97. 4,290,928,412
98. 5,436,252,912
99. 6,201,948,632
100. 9,797,700,132

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1. (a) 40,069 (c) 89,566 (e) 131,992 (g) 176,775 (i) 230,986
   (b) 54,211 (d) 110,779 (f) 162,633 (h) 209,773 (j) 235,700
2. (a) 69,156 (c) 154,584 (e) 227,808 (g) 305,100 (i) 398,664
   (b) 93,564 (d) 191,196 (f) 280,692 (h) 362,052 (j) 406,800
3. (a) 96,798 (c) 159,432 (e) 318,864 (g) 427,050 (i) 558,012
   (b) 130,962 (d) 267,618 (f) 392,886 (h) 506,766 (j) 569,400
4. (a) 29,512 (c) 65,968 (e) 97,216 (g) 130,200 (i) 170,128
   (b) 39,928 (d) 81,592 (f) 119,784 (h) 154,504 (j) 173,600
5. (a) 44,149 (c) 98,686 (e) 145,432 (g) 194,775 (i) 254,506
   (b) 59,731 (d) 122,059 (f) 179,193 (h) 131,133 (j) 259,700
6. (a) 51,816 (c) 115,804 (e) 170,688 (g) 228,600 (i) 298,684
   (b) 70,104 (d) 143,256 (f) 210,312 (h) 271,072 (j) 304,800
7. (a) 114,223 (c) 255,322 (e) 376,264 (g) 503,925 (i) 658,462
   (b) 154,537 (d) 315,793 (f) 463,611 (h) 597,991 (j) 671,900
8. (a) 32,079 (c) 71,706 (e) 105,672 (g) 141,525 (i) 184,926
   (b) 43,401 (d) 88,689 (f) 120,203 (h) 167,943 (j) 188,700
9. (a) 43,928 (c) 98,192 (e) 144,704 (g) 193,800 (i) 260,162
   (b) 59,432 (d) 121,448 (f) 178,296 (h) 229,976 (j) 258,400
10. (a) 53,839 (c) 120,346 (e) 177,352 (g) 237,525 (i) 310,366
    (b) 72,841 (d) 148,849 (f) 218,523 (h) 281,863 (j) 316,700

1. (a) 781,453 (e) 979,011 (h) 1,642,212
   (b) 1,084,281 (f) 3,007,213 (i) 2,382,611
   (c) 1,670,284 (g) 1,386,055 (j) 3,147,573
   (d) 2,049,256
2. (a) 604,128 (e) 776,736 (h) 1,302,912
   (b) 860,256 (f) 2,385,888 (i) 1,890,336
   (c) 1,325,184 (g) 1,099,680 (j) 2,497,248
   (d) 1,625,856
3. (a) 296,205 (e) 380,835 (h) 638,820
   (b) 421,785 (f) 1,169,805 (i) 926,835
   (c) 649,740 (g) 539,175 (j) 1,224,405
   (d) 797,160
4. (a) 596,316 (e) 766,692 (h) 1,286,064
   (b) 849,132 (f) 2,355,036 (i) 1,865,892
   (c) 1,308,048 (g) 1,085,460 (j) 2,464,956
   (d) 1,604,832

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5. (a) 672,049 (e) 864,063 (h) 1,449,396
(b) 956,973 (f) 2,654,129 (i) 2,102,863
(c) 1,474,172 (g) 423,315 (j) 2,778,009
(d) 1,808,648

6. (a) 624,092 (e) 802,404 (h) 1,345,968
(b) 888,684 (f) 2,464,732 (i) 1,952,804
(c) 1,368,976 (g) 1,136,020 (j) 2,579,772
(d) 1,679,584

7. (a) 848,036 (e) 1,090,332 (h) 1,828,944
(b) 1,207,572 (f) 3,349,156 (i) 2,653,532
(c) 1,860,208 (g) 1,543,660 (j) 3,505,476
(d) 282,272

8. (a) 596,099 (e) 766,413 (h) 1,285,596
(b) 848,823 (f) 2,354,179 (i) 1,865,213
(c) 1,307,572 (g) 1,085,065 (j) 2,464,059
(d) 1,604,248

9. (a) 1,234,513 (e) 1,587,231 (h) 2,662,452
(b) 1,757,901 (f) 4,875,473 (i) 3,862,831
(c) 2,707,964 (g) 2,247,155 (j) 5,103,033
(d) 3,322,376

10. (a) 862,575 (e) 1,109,025 (h) 1,860,300
(b) 1,228,275 (f) 3,406,575 (i) 2,699,025
(c) 1,892,100 (g) 1,570,125 (j) 3,565,575
(d) 2,321,400

Page 19

26. 85 29. 92 32. $106\frac{5}{19}$ 35. 107 38. 316
27. 82 30. 96 33. 106 36. $264\frac{1}{3}$
28. 95 31. $192\frac{3}{5}$ 34. 105 37. $333\frac{1}{4}$

Page 20

39. $615\frac{17}{19}$ 49. 1,166 59. 131,652 69. 8,899
40. 486 50. $1,326\frac{27}{49}$ 60. 3,760 70. 35,879
41. $753\frac{17}{68}$ 51. 2,456 61. 775 71. 58,937
42. 582 52. 6,424 62. 867 72. 70,186
43. 683 53. 25,631 63. 999 73. 107,638
44. 638 54. 47,828 64. 3,578 74. 130,597
45. 783 55. 96,142 65. 4,096 75. 486,005
46. 794 56. 95,761 66. $880\frac{471}{1519}$ 76. 164,209
47. 878 57. $97,615\frac{7}{587}$ 67. 7,978
48. 916 58. 16,087 68. 17,068

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Page 21

1.	(a)	3,840	(c)	1,440	(e)	1,280	(g)	480	(i) 240
	(b)	1,920	(d)	720	(f)	2,560	(h)	160	(j) 360
2.	(a)	2,880	(c)	1,080	(e)	960	(g)	360	(i) 180
	(b)	1,440	(d)	540	(f)	1,920	(h)	120	(j) 270
3.	(a)	1,152	(c)	432	(e)	384	(g)	144	(i) 72
	(b)	576	(d)	216	(f)	768	(h)	48	(j) 108
4.	(a)	864	(c)	324	(e)	288	(g)	108	(i) 54
	(b)	432	(d)	162	(f)	576	(h)	36	(j) 81
5.	(a)	1,632	(c)	612	(e)	544	(g)	204	(i) 102
	(b)	816	(d)	306	(f)	1,088	(h)	68	(j) 153
6.	(a)	1,440	(c)	540	(e)	480	(g)	180	(i) 90
	(b)	720	(d)	270	(f)	960	(h)	60	(j) 135
7.	(a)	1,536	(c)	576	(e)	512	(g)	192	(i) 96
	(b)	768	(d)	288	(f)	1,024	(h)	64	(j) 144
8.	(a)	768	(c)	288	(e)	256	(g)	96	(i) 48
	(b)	384	(d)	144	(f)	512	(h)	32	(j) 72
9.	(a)	6,720	(c)	2,520	(e)	2,240	(g)	840	(i) 420
	(b)	3,360	(d)	1,260	(f)	4,480	(h)	280	(j) 630
10.	(a)	48,000	(c)	18,000	(e)	16,000	(g)	6,000	(i) 3,000
	(b)	24,000	(d)	9,000	(f)	32,000	(h)	2,000	(j) 4,500

1.	(a)	1,920	(c)	320	(e)	360	(g)	160	(i) 60
	(b)	1,280	(d)	640	(f)	120	(h)	180	(j) 80
2.	(a)	3,840	(c)	640	(e)	720	(g)	320	(i) 120
	(b)	2,560	(d)	1,280	(f)	240	(h)	360	(j) 160
3.	(a)	2,880	(c)	480	(e)	540	(g)	240	(i) 90
	(b)	1,920	(d)	960	(f)	180	(h)	270	(j) 120
4.	(a)	1,632	(c)	272	(e)	306	(g)	136	(i) 51
	(b)	1,088	(d)	544	(f)	102	(h)	153	(j) 68
5.	(a)	4,800	(c)	800	(e)	900	(g)	400	(i) 150
	(b)	3,200	(d)	1,600	(f)	300	(h)	450	(j) 200
6.	(a)	5,760	(c)	960	(e)	1,080	(g)	480	(i) 180
	(b)	3,840	(d)	1,920	(f)	360	(h)	540	(j) 240
7.	(a)	6,720	(c)	1,120	(e)	1,260	(g)	560	(i) 210
	(b)	4,480	(d)	2,240	(f)	420	(h)	630	(j) 280

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8. (a) 8,640 (c) 1,440 (e) 1,620 (g) 720 (i) 270
(b) 5,760 (d) 2,880 (f) 540 (h) 810 (j) 360

9. (a) 7,680 (c) 1,280 (e) 1,440 (g) 640 (i) 240
(b) 5,120 (d) 2,560 (f) 480 (h) 720 (j) 320

10. (a) 2,304 (c) 384 (e) 432 (g) 192 (i) 72
(b) 1,536 (d) 768 (f) 144 (h) 216 (j) 96

Page 22

1. $6,750
2. 4,391,562
3. 119,603 bu.
4. $5.87
5. 5,663 bu. ; $3792.28

Page 23

6. $111,711.50
7. $324,491.34
8. $31.36
9. 98 bu.
10. 275 A.
11. 7,772,160 ft.
12. 49,843,200 lb.

Page 24

13. $5
14. 47,040 mi.
15. $9586
16. 29,546 lb.
17. $22.14
18. 29 hr.
19. $64

Page 25

20. $54.05
21. $20,650
22. $23,800
23. (a) 4,526
(b) 4,380
(c) 325,069
(d) 61
24. 414 mi.

Page 26

1. 2, 2, 2, 2, 2
2. 2, 2, 2, 7
3. 2, 2, 2, 33
4. 2, 2, 23
5. 2, 67
6. 2, 2, 2, 17
7. 2, 3, 23
8. 3, 47
9. 2, 5, 23
10. 2, 3, 3, 3, 7
11. 3, 11, 13
12. 2, 3, 107
13. 2, 3, 3, 3, 13
14. 3, 5, 53
15. 2, 3, 3, 47
16. 2, 2, 3, 3, 5, 7
17. 3, 7, 11, 13
18. 2, 3, 5, 5, 29
19. 2, 2, 3, 3, 3, 5, 13
20. 2, 3, 3, 5, 79

1. 9
2. 13
3. 9
4. 3
5. 3
6. 39
7. 36
8. 21
9. 6
10. 135
11. 12
12. 13
13. 1
14. 36
15. 36
16. 42
17. 32
18. 96
19. 24
20. 22
21. 153
22. 33
23. 273
24. 192
25. 308
26. 172
27. 185
28. 402
29. 111
30. 111
31. 112
32. 102
33. 11
34. 13
35. 33
36. 17

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Page 27

1. 60 gal.
2. 96 A.
3. 24 bu.
4. 3 ft.
5. 5 cents
6. 16,560
7. 12 ft.
8. 17
9. 225

Page 28

1. 120
2. 144
3. 1,890
4. 5,040
5. 5,670
6. 77,280
7. 11,520
8. 5,544
9. 10,800
10. 23,040
11. 19,008
12. 2,850
13. 2,520
14. 31,185
15. 3,360
16. 1,152
17. 2,160
18. 960
19. 1,320
20. 660
21. 180 in.
22. (a) 504 min.
    (b) 1st. 28 times
    (c) 2nd. 24 times
    (d) 3rd. 21 times
23. 24 qt.

Page 29

24. $100
25. 432 in.
26. 1,050 ft.
27. $\frac{1}{3}$ bu.
28. 924 ft.
29. 48 qt.
30. 15 yd.
31. 100 cents
32. 58,800 lb.
33. 360 ft.

Page 30

1. $\frac{1}{2}$
2. $\frac{1}{4\,8}$
3. $\frac{1}{1\,2}$
4. $\frac{1}{8}$
5. $\frac{1}{1\,2\,5}$
6. 1
7. $\frac{5}{2\,5}$
8. $\frac{5}{1\,0}$
9. $2\frac{1\,7}{4\,4}$
10. $\frac{9\,9}{1\,0\,0\,4}$
11. $\frac{1}{4\,0}$
12. 1
13. $6\frac{2}{3}$
14. $\frac{1}{4\,5}$
15. $\frac{1}{2\,5}$
16. $\frac{1}{1\,1}$
17. 1
18. 1
19. $\frac{1}{2}$
20. 1
21. $\frac{1\,2\,5}{4\,4\,8}$
22. $\frac{1}{1\,2\,5\,0}$
23. $\frac{2\,5}{2\,5\,5\,6}$
24. $\frac{1\,2}{2\,5}$
25. $\frac{6\,5\,6\,1}{1\,0\,0\,4\,7\,3}$
26. $\frac{9}{1\,0}$

Page 31

27. 63
28. $2\frac{1\,1}{2\,2\,4}$
29. $22\frac{1}{2}$
30. $2\frac{1}{3}$
31. $\frac{5}{6}$
32. 168
33. $32
34. 27
35. $.098
36. $10\frac{6}{2\,5}$
37. 32

Page 37

1. $1\frac{1}{1\,2}$
2. $1\frac{4\,9}{6\,0}$
3. $1\frac{7\,8}{1\,2\,0}$
4. $2\frac{7}{7\,8}$
5. $1\frac{1\,0\,1}{1\,0}$
6. $2\frac{8\,7}{1\,2\,0}$
7. $1\frac{5\,9}{6\,0}$
8. $1\frac{2\,3}{5\,4}$
9. $\frac{3\,9}{6\,0}$
10. $1\frac{1\,4\,3}{1\,8\,0}$
11. $1\frac{4}{6\,3}$
12. $2\frac{1}{3}$
13. $1\frac{6\,3}{7\,2}$
14. $1\frac{1\,1}{1\,2}$
15. $1\frac{1\,1}{1\,2}$
16. $2\frac{9}{2\,0}$
17. $2\frac{5}{1\,8}$
18. $2\frac{1\,1}{2\,4}$
19. $2\frac{1\,1}{2\,5}$
20. $2\frac{3\,9}{7\,2}$
21. $2\frac{1}{3}$
22. $1\frac{2\,9}{3\,6}$
23. $2\frac{8}{3\,5}$
24. $2\frac{1\,1}{2\,4}$
25. $1\frac{1\,1}{1\,2}$
26. $1\frac{4\,1}{2\,5}$
27. $2\frac{3}{7}$
28. $1\frac{5}{7\,2}$
29. $2\frac{4}{1\,5}$
30. $4\frac{1}{3}$
31. $1\frac{1\,1}{1\,2}$
32. $2\frac{3\,1}{3\,3}$
33. $\frac{7}{1\,6}$
34. 1
35. $2\frac{2\,3}{3\,0}$
36. $2\frac{1\,7}{1\,9}$
37. $3\frac{4}{1\,1}$
38. $3\frac{1\,3}{1\,7}$

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1. $11\frac{1}{8}$
2. $11\frac{1}{12}$
3. $7\frac{1}{2}$
4. $12\frac{20}{21}$
5. $7\frac{3}{8}$
6. $20\frac{1}{15}$
7. $13\frac{17}{24}$
8. $31\frac{29}{30}$
9. $47\frac{17}{18}$
10. $47\frac{23}{24}$
11. $36\frac{11}{16}$
12. $44\frac{1}{2}$
13. $43\frac{37}{40}$
14. $56\frac{53}{60}$
15. $39\frac{43}{60}$
16. $54\frac{65}{365}$
17. $49\frac{17}{180}$
18. $45\frac{23}{180}$
19. $49\frac{11}{60}$
20. $40\frac{23}{30}$
21. $55\frac{3}{16}$
22. $28\frac{51}{100}$
23. $46\frac{4}{15}$
24. $24\frac{1}{60}$
25. $38\frac{73}{180}$
26. $50\frac{13}{16}$
25. $\frac{1}{60}$
26. $\frac{49}{180}$
27. $\frac{233}{360}$
28. $\frac{23}{100}$
29. $\frac{69}{100}$
30. $\frac{19}{300}$

Page 39

1. $8\frac{1}{6}$
2. $1\frac{1}{4}$
3. $6\frac{1}{12}$
4. $5\frac{1}{2}$
5. $8\frac{7}{10}$
6. $9\frac{1}{30}$
7. $9\frac{5}{12}$
8. $5\frac{13}{30}$
9. $2\frac{3}{56}$
10. $6\frac{11}{12}$
11. $20\frac{3}{10}$
12. $4\frac{23}{30}$
13. $17\frac{13}{30}$
14. 20
15. $12\frac{9}{10}$
16. $26\frac{11}{12}$
17. $38\frac{3}{15}$
18. $15\frac{7}{10}$
19. $28\frac{1}{2}$
20. $34\frac{5}{12}$
21. $19\frac{3}{5}$
22. $39\frac{1}{24}$
23. $19\frac{13}{30}$
24. $48\frac{23}{40}$
25. $24\frac{9}{10}$
26. $25\frac{143}{180}$
27. $14\frac{33}{180}$
28. $17\frac{83}{100}$
29. $90\frac{37}{100}$
30. $19\frac{11}{60}$
31. $54\frac{53}{70}$
32. $62\frac{11}{15}$
33. $\frac{13}{20}$
34. $18\frac{13}{24}$
35. $46\frac{7}{8}$
36. $47\frac{71}{72}$
37. $80\frac{23}{25}$
38. $91\frac{19}{24}$

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14. $\frac{3}{40}$
15. $\frac{3}{5}$
16. $\frac{1}{18}$
17. $\frac{1}{12}$
18. $\frac{43}{365}$
19. $\frac{37}{100}$
20. $1\frac{1}{7}$
21. $\frac{1}{300}$
22. $3\frac{3}{8}$
23. $\frac{7}{360}$
24. $\frac{21}{1000}$
25. $1\frac{1}{5}$
26. $16\frac{3}{8}$
27. $11\frac{1}{4}$
28. $21\frac{7}{8}$
29. $31\frac{1}{4}$
30. $33\frac{1}{3}$
31. $18\frac{3}{4}$
32. 30
33. $85\frac{3}{4}$
34. $15\frac{5}{8}$
35. $13\frac{1}{3}$
36. $8\frac{1}{3}$
37. $9\frac{3}{8}$
38. $43\frac{3}{4}$
39. $7\frac{13}{16}$
40. 50
41. $73\frac{1}{3}$
42. $18\frac{3}{4}$
43. $13\frac{1}{3}$
44. $65\frac{1}{3}$
45. $36\frac{3}{4}$
46. $18\frac{3}{4}$
47. $30\frac{5}{8}$
48. 66
49. $46\frac{7}{8}$
50. $9\frac{3}{8}$

Page 41

1. $13\frac{13}{24}$
2. $4\frac{5}{6}$
3. $8\frac{13}{15}$
4. 68
5. $12\frac{1}{3}$
6. $14\frac{1}{3}$
7. $209\frac{33}{35}$
8. $314\frac{1}{64}$
9. $5\frac{31}{40}$
10. $7\frac{35}{64}$
11. $103\frac{1}{15}$
12. $32\frac{1}{4}$
13. $59\frac{1}{3}$
14. $242\frac{3}{20}$
15. $224\frac{9}{14}$
16. $196\frac{19}{37}$
17. $102\frac{1}{7}$
18. $113\frac{1}{4}$
19. $117\frac{3}{5}$
20. $33\frac{1}{3}$
21. $489\frac{3}{5}$
22. $168\frac{3}{4}$
23. $35\frac{1}{4}$
24. $9\frac{1}{3}$
25. $243\frac{1}{3}$
26. $6\frac{17}{18}$
27. $68\frac{1}{3}$
28. 365
29. $7\frac{1}{3}$
30. $6\frac{1}{4}$
31. $34\frac{17}{18}$
32. $8\frac{73}{80}$
33. 15
34. 1,422
35. 1,080
36. $120\frac{59}{60}$
37. $3{,}141\frac{3}{5}$
38. $277\frac{1}{3}$
39. $8\frac{4}{5}$
40. $497\frac{7}{24}$

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1. 6
2. 2
3. 2
4. 25
5. $\frac{1}{6}$
6. $\frac{3}{5}$
7. $1\frac{1}{6}$
8. $\frac{3}{10}$
9. 8
10. $1\frac{1}{3}$
11. $\frac{2}{3}$
12. $\frac{2}{5}$
13. $1\frac{5}{16}$
14. $\frac{2}{3}$
15. $\frac{5}{8}$
16. $1\frac{1}{3}$
17. $\frac{1}{3}$
18. 2
19. $3\frac{1}{3}$
20. $\frac{3}{8}$
21. $\frac{3}{10}$
22. 1
23. $1\frac{37}{213}$
24. $\frac{3}{8}$
25. $\frac{5}{6}$
26. $\frac{2}{3}$

1. 10
2. 4
3. $4\frac{1}{3}$
4. $\frac{56}{171}$
5. $\frac{3}{4}$
6. 12
7. 18
8. $2\frac{7}{15}$
9. $\frac{8}{15}$
10. 68
11. $\frac{5}{42}$
12. $\frac{1}{50}$
13. $\frac{1}{60}$
14. $\frac{1}{240}$
15. $\frac{4}{5}$
16. $\frac{1}{3}$
17. 20
18. 36
19. $12\frac{35}{288}$
20. 7
21. $1\frac{1}{7}$
22. $3\frac{9}{50}$
23. 45
24. $1\frac{7}{25}$
25. 10
26. $\frac{6}{7}$

Page 43

1. $\frac{18}{50}$
2. $\frac{3}{5}$
3. $\frac{1}{4}$
4. $\frac{17}{18}$
5. $\frac{20}{99}$
6. $\frac{714}{800}$
7. $1\frac{1}{4}$
8. $\frac{2}{7}$
9. $7\frac{11}{18}$
10. 43

1. 233 A.
2. \$178$\frac{1}{2}$
3. $37\frac{1}{2}$ A.
4. $154\frac{5}{8}$ A.

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5. $50\frac{17}{20}$ hr.
6. $\frac{13}{16}$
7. $262\frac{1}{2}$ mi.
8. $41\frac{3}{8}$ gal.
9. $235\frac{11}{24}$
10. $122\frac{3}{5}$ bu.
11. $191\frac{1}{8}$ bu.
12. $\$254\frac{1}{20}$
13. $121\frac{1}{8}$ mi.

Page 45

14. $75\frac{183}{200}$ T.
15. $\$1189\frac{1}{2}$

1. $\$12\frac{13}{20}$
2. $182\frac{1}{24}$ mi.; $25\frac{7}{24}$ mi.
3. $\$1\frac{3}{4}$
4. $8\frac{1}{15}$ yd.
5. $12\frac{11}{16}$
6. $23\frac{13}{44}$
7. $15\frac{23}{35}$
8. (a) $\$205\frac{3}{4}$ (b) $\$175\frac{11}{20}$ (c) $\$151\frac{3}{20}$ (d) $\$74\frac{9}{20}$

Page 46

9. $43\frac{1}{4}$ mi.
10. $\frac{13}{60}$
11. $132\frac{13}{16}$ A.; $119\frac{5}{16}$ A.; $71\frac{13}{16}$ A.
12. $381\frac{5}{8}$ bu.
13. $189\frac{13}{14}$
14. 90 bu.
15. $\$43\frac{1}{4}$
16. \$111
17. $461\frac{1}{3}$ mi.; $460\frac{2}{3}$ mi.

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1. $75\frac{14}{16}$ sq. yd.
2. $24\frac{2}{3}$ mi.
3. $27.63
4. 928 mi.
5. $96\frac{3}{4}$ yd.
6. $800
7. $\$168\frac{9}{16}$
8. $\$476\frac{1}{2}$
9. $30\frac{1}{4}$ sq. yd.
10. $102\frac{3}{8}$ yd.
11. $\$1651\frac{7}{8}$
12. $2670\frac{5}{8}$ mi.
13. $\$60\frac{5}{24}$

Page 48

14. 60,500 sq. yd.
15. $1112\frac{21}{64}$
16. $190\frac{341}{1440}$ mi.
17. $30.24

1. $\$1\frac{78}{100}$
2. 19
3. $18\frac{6}{56}$ bu.
4. 24 hr.
5. 79,200
6. $79\frac{441}{484}$ sq. rd.
7. 24

Page 49

8. $930
9. 168 ft.
10. $\$153\frac{82}{175}$
11. 26
12. $\frac{1}{3}$ bbl.
13. 9 lb.
14. $53\frac{1}{3}$ mi. per hr.; $\frac{8}{9}$ mi. per min.
15. $12\frac{1}{2}$ hr.
16. $4\frac{102}{168}$
17. $2\frac{1}{8}$
18. $\frac{3}{4}$
19. $15\frac{5}{8}$ T.
20. 29 bbl.

Page 50

1. $12\frac{1}{10}$ A.
2. $16\frac{4}{7}$ da.; $8\frac{7}{10}$ hr.
3. $\frac{17}{120}$
4. $\frac{3}{8}$
5. $4.265
6. $1\frac{47}{150}$ tons
7. $75\frac{85}{128}$ bu.
8. $82\frac{1}{8}$ gal.

Page 51

9. $36.34
10. $2\frac{3}{4}$ yd.
11. $1{,}100\frac{13}{30}$ mi.
12. $\$29\frac{11}{30}$
13. 2 hr.; 49 mi.; $36\frac{1}{2}$ mi.
14. $\frac{13}{15}$
15. $\$15.89\frac{7}{8}$; $\$2.67\frac{3}{8}$
16. $\$.62\frac{39}{71}$
17. $8\frac{7}{15}$ da.

Page 52

18. $94\frac{1}{3}$
19. $\frac{35}{52}$
20. 12
21. $126\frac{7}{16}$; $109\frac{5}{16}$
22. $\frac{15}{16}$ da.

1. 5,280 ft.
2. 640 A. or 1 sq. mi.
3. $\frac{3}{5}$
4. $\$3{,}619\frac{1}{8}$
5. $81\frac{61}{384}$ mi.

Page 53

6. $115\frac{5}{21}$ yd.
7. $\frac{3}{4}$
8. $\$5{,}231\frac{1}{4}$
9. $2,952
10. $4,500; $5,000
11. $2,760; $1,725
12. $575\frac{1}{3}$ A.
13. A's $1,597$\frac{1}{3}$; B's $1,704; C's $958\frac{1}{3}$
14. 12 mo.

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15. \$.12½ 16. \$5⅝ 17. Older, \$40; younger, \$36
18. Wife, \$5400; daughter, \$3150; son, \$3960 19. 798; 304
20. A, 9½ da.; B, 19 da. 21. \$2,500 22. ⅝; \$27,000 23. 1,372 A.

Page 59

1. $\frac{3}{8}$	5. $\frac{1}{125}$	9. $\frac{11}{100}$	13. $\frac{7}{1000}$	17. $\frac{3}{50}$
2. $\frac{9}{100}$	6. $\frac{33}{100}$	10. $\frac{3}{8}$	14. $\frac{3}{8}$	18. $\frac{1}{100}$
3. $\frac{13}{25}$	7. $\frac{13}{1000}$	11. $\frac{9}{125}$	15. $\frac{13}{8}$	19. $\frac{9}{10}$
4. $\frac{19}{100}$	8. $\frac{3}{8}$	12. $\frac{111}{1000}$	16. $\frac{3}{8}$	20. $\frac{1}{100}$

1. .33⅓	5. .0125	9. .8125	13. .88⅜	17. .05
2. .75	6. .03¾	10. .04	14. 2.7	18. .014
3. .08⅓	7. .8	11. .83⅓	15. .00⅜	19. .833⅓
4. .0625	8. .875	12. 3.85	16. .00⅞	20. 3.75

1. 18.21 2. 19.53 3. 15.47 4. 18.29 5. 25.06

Page 60

6. 228.35	9. 316.	12. 372.91	15. 438.7	18. 2,236.66
7. 333.3	10. 495.03	13. 447.2	16. 3196.38	19. 5,604.75
8. 260.45	11. 433.29	14. 460.76	17. 1163.25	20. 4,580.31

Page 61

21. 466.88	24. 454.49	27. 44,811.97	30. 113,438.66
22. 621.12	25. 482.40	28. 28,083.99	31. 27,911.21
23. 605.82	26. 415.30	29. 629.64	

Page 62

1. 29.95	11. .94	21. 20.19	31. 1.109	41. 6.5049
2. 35.89	12. 19.69	22. 9.93	32. 10.809	42. .1012
3. 18.84	13. 10.09	23. 18.33	33. 1.837	43. .9089
4. 29.09	14. 9.78	24. 11.79	34. 8.056	44. 3.9181
5. 17.99	15. 20.83	25. 20.05	35. 27.581	45. 25.9509
6. 68.99	16. 12.99	26. 4.671	36. 10.105	46. 17.3764
7. 19.59	17. 11.18	27. 11.089	37. 8.1569	47. 8.0902
8. 8.99	18. .83	28. 11.978	38. .4785	48. .11211
9. 27.99	19. .08	29. 48.065	39. 17.0123	49. .90897
10. 19.89	20. 10.08	30. 1.201	40. 26.3609	50. .492455

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Page 63

1. 88.8
2. 1.61
3. 67.68
4. 176.9
5. 365
6. 100.334
7. 69.12
8. 775.2
9. 68.31
10. 34.944
11. 2.61
12. 1.0582
13. 273.9
14. 16.6428
15. 395.28
16. 1.45539
17. .19642
18. 1.62714
19. 100.254
20. 6.4685
21. .143184
22. .563832
23. 2.98965
24. .108086
25. .0433422
26. 3.13054
27. 1.48332
28. 6.5481
29. 21.8508
30. 1.84465
31. 386.37
32. 2.76969
33. .022344
34. .250312
35. 5.6724
36. 22.3951
37. 4.6944
38. 715.65
39. 5.7815
40. .75565
41. .444204
42. .025714
43. 40.0272
44. .071732
45. 5.59215
46. .97911
47. .038304
48. .292365
49. 242.1993
50. .0590433

Page 64

1. $133.65
2. $66.69
3. $337.28
4. $717.5625
5. $7,481.25
6. $110.10
7. $1,240.55
8. $22,602.85
9. $1,753.30
10. $4,254.25

1. 3,400.8 sq. yd.
2. 4,695.6 sq. yd.
3. 3,728.4 sq. yd.
4. 1,501 sq. yd.
5. 8,284.8 sq. yd.
6. 915.12 sq. rd.
7. 271.04 sq. rd.
8. 1,072.56 sq. rd.
9. 231.295 sq. rd.
10. 428.6096 sq. rd.

1. $116.796
2. $369.854
3. $413.6525

Page 65

1. .85
2. .96
3. 36.9
4. 6.7
5. .24
6. 486
7. .86
8. 71.8
9. 2.06
10. 160
11. 863
12. .79
13. .82
14. .048
15. 47.4
16. 3700
17. .79
18. 967
19. 5375
20. .79
21. 3.09
22. 24,975
23. 1.25
24. 56,000
25. 157,900
26. .1296
27. 1016
28. 121.8
29. 2.25
30. 6347
31. 157.35
32. 5.1073
33. 36.402
34. 6.0041
35. 7.475
36. 8.0706
37. .9067
38. .7008
39. 6.879
40. .512
41. 172.8
42. .3456
43. .8069
44. 5.432
45. 7.698
46. .08192
47. .003786
48. 80,056
49. .75075
50. 1.8625

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Page 66

1. $4.50
2. $3.50
3. $94
4. $.84
5. $.54
6. $.64
7. $.083
8. $53
9. $.063
10. $.72
11. 52.2026+ ft.
12. 135.5996+ ft.
13. 4.5518+ ft.
14. 533.4861+ rd.
15. 381.9709+ rd.
16. 20.13 sq. rd.
17. 324.5 sq. rd.
18. 45.81 sq. rd.
19. 7.658 sq. rd.
20. 879.9 sq. rd.

Page 67

21. 4.7 bu.
22. .83 bu.
23. .008 bu.
24. 3.57 bu.
25. 450 bu.
26. 3.8 bu.
27. 56 bu.
28. 14.9 bu.
29. 2.05 bu.
30. 83 bu.
31. 76 m.
32. 54 m.
33. .29 m.
34. 38 m.
35. 70 m.
36. .46 m.
37. 1.02 m.
38. 7.05 m.
39. .026 m.
40. 8.9 m.
41. £57
42. £36
43. £29
44. £48
45. £87
46. £38
47. £125
48. £206
49. £.75
50. £6.7

Page 68

1. 156 yd.
2. 4.875 yd.
3. $627
4. 12 bbl.
5. 987.07 sq. mi.
6. 690.94 sq. mi.
7. 196,680 ft.
8. 16 lots

Page 69

9. 213.88 ft.
10. 3.37 in.
11. 101,886.8996 cu. in.
12. 486 rd.
13. 5699.17 mi.
14. $37.80
15. $1431
16. $.0225
17. $3595.40
18. 179.57 bu.

Page 70

19. 1402.6925 sq. yd.
20. $8.40
21. 1437.005 in.
22. $12.84
23. $42.58
24. 4593.85 mi.
25. $36
26. 5600 bu.
27. $212.36
28. 117.04008 mi.; 151.8222 mi.; 268.86228 mi.

Page 71

29. 45 bu.
30. 982.86 mi.
31. 2755.99 bu.
32. $1.728
33. $2.34
34. $944.87
35. $442.26
36. 75 sq. rd.
37. $28.44

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38. $18 802
39. 1.09+ yd.
40. $31.32; $70.45; $39.13
41. $13.124
42. .159; .287; .446
43. $.01⅝
44. 3.6 da.
45. 16.03 ft.

Page 73

1. (a) $67.21
   (b) $59.50
   (c) $85.08
   (d) $69.99
   (e) $49.44
   (f) $65.17
2. (a) $52.19
   (b) $60.74
   (c) $57.38
   (d) $50.44
   (e) $56.21
   (f) $54.14
3. (a) $276.06
   (b) $294.05
   (c) $290.50
   (d) $310.93
   (e) $293.77
   (f) $263

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4. (a) $1629.70
   (b) $1566.49
   (c) $1868.35
   (d) $1703.29
   (e) $1830.56
   (f) $1998.47
5. (a) $1810.55
   (b) $1826.06
   (c) $1714.31
   (d) $2522.45
   (e) $1867.20
   (f) $1393.48
6. (a) $617.51
   (b) $660.34
   (c) $611.65
   (d) $663.46
   (e) $623.27
   (f) $661.63

Page 75

1. 4,644 in.
2. 10,560 ft.
3. 302,032½ ft.
4. 320 rd.; 5280 ft.
5. 15,840 in.
6. 1,575 yd.
7. 63 rd., 3 yd., 1 ft., 6 in.
8. 80 rd.
9. 50 mi.
10. 284 in.
11. 5,541⅓ yd.
12. 280 rd.; 1,540 yd.; 4620 ft.; 55,440 in.
13. 328 rd., 5 yd.
14. 4 mi. 30 rd.
15. $\frac{1}{18}$ mi.
16. 134.046 in.
17. 62 rd., 2 yd., 2 in.
18. 46 rd., 5 yd.
19. 68 rd., 4 in.
20. 887.636 in.
21. 240 rd.; 1320 yd.; 3960 ft.; 47,520 in.
22. 254 rd., 5 yd.
23. $\frac{5}{99}$ mi.
24. 243,127½ ft.
25. 74 rd., 5 yd., 2 ft., 6 in.

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Page 76

26. 65 poles **28.** $\frac{1}{8}$ mi. **29.** $240 **30.** $\frac{5}{44}$ mi.
27. 3520 yd.

1. 62,208 sq. in.
2. 35,712 sq. in.
3. 40,293 sq. ft.
4. 640 A., 102,400 sq. rd., 3,097,600 sq.yd., 27,878,400 sq. ft., 4,014,489,600 sq. in.
5. 184,585$\frac{1}{2}$ sq. ft.
6. 7 sq. yd.
7. 120 sq. rd.
8. 25 A.
9. 200 sq. rd., 17 sq. yd.
10. 1 mi., 160 A., 17 sq. yd., 7 sq. ft.
11. 4,083$\frac{3}{4}$ sq. ft.
12. 310,153$\frac{1}{4}$ sq. yd.

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13. 2 sq. rd., 28 sq. yd., 2 sq. ft., 88 sq. in.
14. 145,659,800 sq. yd.
15. 25 sq. yd., 67 sq. in.
16. 5 A., 92 sq. rd., 23 sq. yd.
17. 1 A., 83 sq. rd., 8 sq. yd., 2 sq. ft., 36 sq. in.
18. 20,908,800 sq. ft.
19. 108,488,600 sq. yd.
20. 5 sq. rd., 18 sq. yd., 90 sq. in.

1. 169,344 cu. in.
2. 990 cu. ft.
3. 2,660,330 cu. in.
4. 1290 cu. ft.
5. 1290 cu. ft.
6. 9 cu. ft.
7. 25 cu. yd.
8. 25 cu. ft., 65 cu. in.
9. 2 cords, 20 cu. ft.
10. 143 cu. yd., 9 cu. ft.
11. 52 cu. yd., 7 cu. ft., 1363 cu. in.
12. 2 cords, 33 cu. ft., 608 cu. in.
13. 3208 cu. ft.
14. 17 cu. yd., 23 cu. ft., 1666 cu. in.
15. 2297 perches, 21 cu. ft., 432 cu. in.
16. 789,210,432 cu. in.

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17. 16,142,976 cu. in.
18. 7 cu. yd., 15 cu. ft., 1693 cu. in.
19. 2,121,984 cu. in.
20. 7 cd., 45 cu. ft., 1490 cu. in.

1. 97 pt.
2. 142 qt.
3. 64 pt.
4. 2744 qt.
5. 998 qt.
6. 1 bu., 6 qt.
7. 5 bu., 4 qt.
8. 39 bu.
9. 437 pt.
10. 1073 pt.
11. 23,026 bu., 1 pk., 2 qt.
12. 1870 pt.
13. 1250 pk.
14. 23 bu., 3 pk., 6 qt.
15. 132 bu., 1 pk., 6 qt.
16. 4926 pt.
17. 400 bu.
18. 5400 lb.

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Page 79

19. 67.2 cu. in.
20. 248.89+ cu. ft.
21. 4 ft. 8 in.
22. $30.72
23. 128 boxes
24. 103 bu., 4 qt.
25. 3 bu., 3 pk., 5 qt.

1. 307 gills
2. 682 gills
3. 396 pt.
4. 1102½ gal.
5. 15,561 gal.
6. 11 gal., 1 pt.
7. 129 gal., 2 qt., 1 pt.
8. 54 hhd., 23 gal.
9. 54 bbl., 7 gal.
10. 197 pt.
11. 140 gal., 2 qt., 1 pt.

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12. 487 gills
13. 85 gal.
14. 462 gills
15. 99 bbl., 6 gal., 2 qt.
16. 83 hhd., 1 bbl., 20 gal. 3 qt.
17. 7164 qt.
18. 312 gal., 2 qt.
19. 1307 gills
20. 641 pt.
21. $1.12
22. $2
23. $13.60
24. 11,550 cu. in.
25. 57¼ cu. in.

1. 569 oz.
2. 7½ T.
3. 150,500 lb.
4. 13½ T.
5. $11\frac{3}{10}$ T.

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6. 8⅝ T.
7. 600 T.
8. $318.75
9. 29,220 lb.
10. 4687½ lb.
11. 7878 lb.
12. 84,810 oz.
13. 28,249 oz.
14. 67 T., 719 lb.
15. 20 cwt. 52 lb., 14 oz.
16. 100 T., 13 cwt., 25 lb.
17. 128 T., 2 cwt., 50 lb.
18. 95 cwt., 75 lb., 7 oz.
19. 56,015 oz.
20. 275,257 oz.
21. 30 T.
22. 13½ T.

Page 82

1. 94,694 sec.
2. 8135 min.
3. 152,280 min.
4. 1 wk., 1 hr.
5. 6 yr.
6. 1460 da., 23 hr., 15 min., 4 sec.
7. 1110 da.
8. 14,400 hr.
9. 2 yr., 9 mo., 29 da., 25 min.
10. 4 wk., 3 da., 18 hr., 6 min., 2 sec.
11. 452 mo., 1 da., 18 hr.
12. 507,660 min.
13. 31 mo., 18 da.
14. 41 mo., 27 da.
15. 167 da.
16. 181 da.
17. 7300 da.
18. 1916
19. 5 da., 4 hr., 48 min.
20. 57 da., 20 hr., 53 min., 20 sec.

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Page 83

1. 306 eggs
2. 3600 pens
3. 1260 pencils
4. 70 yr.
5. $495
6. $1.20
7. $5.52
8. $.05
9. 104 reams, 3 quires, 8 sheets
10. 40,210 sheets
11. 6084 ones
12. 33 gross, 2 ones
13. 28 reams, 4 quires, 6 sheets
14. 302 gross, 7 doz.
15. 10,848 ones
16. 93 gross 11 doz., 3 ones
17. 6921 sheets
18. 6918 ones
19. 125 sheets

Page 84

20. $3.50 21. $.04 22. $3.75

1. 2912′
2. 105,454″
3. $\frac{1}{2}°$
4. 13.° 53′ 20″
5. 300°
6. 648,000″
7. 1,296,000″
8. 84,600″
9. 3990′
10. 10° 26′
11. 279° 2′
12. 98,069″
13. 6° 40′ 25″
14. 162,944″
15. 59° 32′
16. 16,200′

Page 85

17. 2909″ 18. $\frac{2}{3}\frac{5}{6}$ circumference

1. 1200 d.
2. 600 d.
3. £75
4. £10
5. $1217.50
6. £220
7. $194.80
8. 3600 d.
9. 6192 d.
10. 4396 d.
11. 4925 d.
12. 480 s.
13. 2535 s.
14. 20 s.
15. 120 s.

16. (a) $72.997\frac{1}{2}$; (b) $116.796; (c) $170.327\frac{1}{2}$; (d) $608.312\frac{1}{2}$
17. (a) £6; (b) £18; (c) £68; (d) £106

Page 86

1. 500 fr. 2. 200 5-fr. pieces 3. 34.6 fr. 4. $386
5. (a) 3.45 fr.; (b) 4.32 fr.; (c) 10 fr.; (d) 14.68 fr.
6. (a) $3.281; (b) $4.439; (c) $15.247; (d) $45.741
7. (a) 25 fr.; (b) 43 fr ; (c) 87 fr.; (d) 306 fr.

1. 86.7 marks 2. $.012 3. 500 marks 4. $714
5. (a) 6.5 marks (b) 7.75 marks (c) 13.5 marks (d) 87.5 marks
6. (a) $5.474 (b) $16.898 (c) $51.17 (d) $198.492
7. (a) 19 marks (b) 63 marks (c) 145 marks (d) 372 marks

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1. 22 yd., 1 ft.
2. 11 lb., 4 oz.
3. 37 rd., 3 yd., 1 ft., 6 in.
4. 20 da., 3 hr.

1. 18 rd., $10\frac{1}{2}$ ft.
2. 13 yr., 11 mo.
3. 49 bu., 1 pk., 4 qt.
4. 21 sq. yd., 2 sq. ft., 36 sq. in.
5. 23 hr., 33 min., 56 sec.
6. 13′, 37.5″

Page 88

1. 29 yd., 1 ft.
2. 31 rd., 2 ft., 2 in.
3. 62 rd., 5 yd., 1 ft.
4. 13 yd., 1 ft., 6 in.
5. 2 da., 4 hr., 30 min.

1. 1′ $14\frac{1}{8}$″ 2. 16 planks 3. 5670 bricks 4. 8 lots 5. 10 strips

Page 89

1. 225 sq. in.
2. 864 sq. in.
3. 2535 sq. ft.
4. 3504 sq. ft.
5. 3762 sq. rd.
6. 3762 sq. yd.
7. 3201 sq. rd.
8. 2994.4 sq. rd.
9. 365 sq. yd., 5 sq. ft.
10. 1474.12 sq. mi.
11. 272.25 sq. in.
12. $1425\frac{1}{16}$ sq. ft.
13. 246.49 sq. ft.
14. 605.16 sq. rd.
15. 4.3264 sq. mi.
16. 2520.04 sq. rd.

16. 66 ft.
17. 85 ft.
18. 125 ft.
19. 114 ft.
20. 90 ft.
21. $48\frac{3}{8}$ rd.
22. $65\frac{3}{4}$ rd.
23. 85 rd.
24. 72.3 rd.
25. 95.8 rd.

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26. 448 sq. ft.
27. 4590 sq. ft.
28. 2400 sq. ft.
29. 2380 sq. rd.
30. 672 sq. ft.
31. 310 sq. ft.
32. 84 sq. ft.
33. 696 sq. ft.
34. 180 sq. ft.
35. 411 sq. ft.
36. $17911\frac{11}{20}$ a.
37. 24 rd.
38. $10.08
39. $23\frac{1}{8}$ M.
40. 660 ft.
41. (a) 1 A. (b) 10 lots

Page 91

42. $7.125
43. $9.45
44. $4.50
45. 24806.25 sq. ft.
46. 17.867+ A.
47. $9\frac{1}{4}$ A.; $1258
48. 1782 sq. ft.
49. 122 sq. ft.
50. 14.4 A.; 1056 yd.
51. 71,148 sq. yd.

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Page 92

1. 85 sq. ft.
2. 270 sq. ft.
3. 203 sq. ft.
4. 2827.5 sq. ft.
5. 5184 sq. ft.
6. 1624 sq. ft.
7. 5235 sq. ft.
8. 1728 sq. ft.
9. 695.2 sq. ft.
10. 764 sq. ft.

1. 170 ft.
2. 172 ft.
3. 184 ft.
4. 214 ft.
5. 530 ft.
6. 956 ft.
7. 1186 ft.
8. 1232 ft.
9. 1276 ft.
10. 1792 ft.

1. 52 ft.
2. 68 ft.
3. 92 ft.
4. 108 ft.
5. 136 ft.
6. 144 ft.
7. 180 ft.
8. 188 ft.
9. 248 ft.
10. 288 ft.

Page 93

1. 5220 sq. ft.
2. 47 ft.
3. 30 ft.
4. $110\frac{10}{11}$ sq. rd.
5. 22 rd.
6. 712,500 sq. ft.
7. $22\frac{88}{111}$ sq. rd.

1. 270 sq. ft.
2. 18 ft.
3. 2250 sq. rd.
4. 60 ft.

Page 94

5. 72 rd.
6. 125 rd.

1. 1188 in.
2. 924 in.
3. 1584 in.
4. 990 in.
5. 792 in.
6. 594 ft.
7. 330 ft.
8. 528 ft.
9. 462 ft.
10. 726 ft.

1. 35.343 ft.
2. 24.3474 ft.
3. 19.635 ft.
4. 12.5664 ft.
5. 54.978 ft.
6. 45.5532 ft.
7. 29.8452 ft.
8. 37.6992 ft.
9. 31.416 ft.
10. 23.562 ft.

Page 95

1. 43.9824 ft.
2. 56.5488 ft.
3. 34.5576 ft.
4. 40.8408 ft.
5. 28.2744 ft.
6. 51.8364 ft.
7. 42.4116 ft.
8. 32.9868 ft.
9. 48.6948 ft.
10. 27.489 ft.

1. 6.827+ ft.
2. 5.2202+ ft.
3. 25.3055+ ft.
4. 33.899+ ft.
5. 53.316+ ft.
6. 6.047+ rd.
7. 67.799+ rd.
8. 28.090+ rd.
9. 47.746+ rd.
10. 71.619+ ft.

1. 49.73+ sq. ft.
2. 113.0976 sq. ft.
3. 2123.7216 sq. ft.
4. 4300.85+ sq. ft.
5. 33.18+ sq. ft.

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Page 96

6. 75.71 sq. rd.

7. 138,655.44 sq. ft.

1. 32 sq. ft., 12 sq. in.
2. 2688 sq. ft.
3. 16,308 sq. in.
4. 10 sq. yd.
5. 30 sq. ft.
6. 785.4 sq. ft.
7. 6911.52 sq. ft.
8. 14,646.14 sq. in.
9. 53,080.47+sq.ft.

Page 97

1. 314.16 sq. ft.
2. 1,017.8784 sq. in.
3. 12732 sq. in.
4. $56.55
5. 25 in.

1. 3240 cu. in.
2. 1728 cu. in.
3. $73.89
4. 714 cu. ft.
5. 5880 cu. ft.
6. 1200 cu. ft.
7. 1242 cu. ft.
8. 1638 cu. ft.
9. 50,400 cu. ft.

Page 98

10. 288 cu. ft.
11. 44,352 cu. yd.
12. 3240 cu. in.
13. 294 cu. yd.
14. 2,592 cu. ft.
15. 28,350 lb.
16. 3 ft., 3 in.
17. 384 sq. ft.
18. 150 cords
19. 18,850$\frac{10}{11}$ gal.
20. 11$\frac{111}{888}$ ft.
21. 5 in.
22. 449 gal.

Page 99

23. 128.57+ bu.
24. $434.61
25. $377.09
26. 628.363+gal.
27. 3.3 ft.
28. $265.36
29. 3616+ bu.
30. 52.5 cu. yd.
31. 62 $\frac{11}{17}$ min.
32. $71.148

Page 100

33. $708.48
34. 8160 cu. ft.
35. 2 ft., 6 in.
36. 43 sq. ft., 24 sq. in.
37. 187+ gal.
38. 70+ bu.

1. 35.343 cu. ft.
2. 452.39 cu. ft.
3. $4618.15
4. 2.6112 gal.
5. 1727.3088 gal.

Page 101

6. 1175.04 gal.; $1.26
7. 226.3+ bbl.
8. 87$\frac{3}{4}$ cu. in.

1. 15 cu. ft.
2. 18 cu. ft.
3. 50 yd.
4. 14 ft.
5. 81 sq. ft.

1. 230.9076 cu. ft.
2. 11.781 cu. in.

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Page 102

3. 150.7968 cu. in. 4. 30 ft. 5. 9 ft. 6. 30 ft.

1. 4,188.8 cu. ft. 3. 7.65 gal. 5. 20 cu. in.
2. 14.1372 cu. ft. 4. 4 ft., 2 in.

1. 12 bd. ft. 2. 441 bd. ft. 3. 270 bd. ft.

Page 103

4. 192 bd. ft. 6. $13.44 8. 1864 bd. ft.
5. $16\frac{2}{3}$ bd. ft. 7. $20.79

1. 42 yd. 2. 57 yd.

Page 104

3. $19.20 5. $20\frac{4}{9}$ yd. 7. $40 9. $39\frac{2}{3}$ yd. 11. $34.40
4. $13 6. $36 8. $340 10. $3.60 12. $50

Page 105

13. $1\frac{2}{3}$ yd. 14. $17.38+ 15. $90 16. $29.21+ 17. $98.56

1. $289\frac{4}{9}$ sq. yd. 2. $17.14

Page 106

3. $15.12 5. $4.64 7. $15.07 9. $76.80
4. $56.53\frac{1}{3}$ 6. $1.20 8. $99.28 10. $13.824

Page 107

11. $1.38 13. 14 bundles 15. $195.84
12. $72 14. $80 16. $25.39

1. $10 2. 18 rolls

Page 108

3. $25.50 6. $8.40 9. $6.30
4. $9.45 7. $11.70 10. $6.45
5. $6.50 8. 13 rolls 11. 14 rolls

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Page 109

1. 336 pt.
2. 256 gills
3. 587,760 oz.
4. 35,952 in.
5. 81 sq. rd., 12 sq. yd., 3 sq. ft., 11.232 sq. in.
6. 1,111,104 cu. in.
7. 536,875,200 sec.
8. 1871 reams 6 quires 20 sheets
9. 14 bbl., 16 gal., 1 qt., 1 pt.
10. 18,560 pt.
11. 94 gal., 2 qt.
12. 10 T., 10 lb.
13. 297 sq. yd.
14. 1 mi., 131 rd., 4 yd., 1 ft.
15. 4 cords, 66 cu. ft., 1216 cu. in.
16. 175 bbl., 75 lb.
17. 99 gal.
18. 210,741.16 cu. in.
19. 1350 gross
20. 698 bu.
21. 260 bu.
22. 500 bu.
23. 390 bu.
24. 680 bu.
25. 400 bbl.

Page 110

26. 24½ bu.
27. $100
28. $8.55
29. $3237.50
30. $6600
31. 2871 ft.
32. $3420
33. 14.4 M.
34. 2000 bd. ft.
35. 16,170 bricks
36. $32,566+

Page 111

37. $41.40
38. 13,824 gal.
39. 360 boards
40. 21 ft.
41. $898.56
42. $31.50
43. 20 sheets
44. £300
45. $2595
46. 10 yd.
47. 1944 sq. in.

Page 112

48. 8800 sq. ft. more in the first lot
49. 238 rd.
50. $1406.25
51. 260 sq. ft.
52. 82 ft.
53. $11.20
54. 180 rd.
55. $377.15
56. 314.16 rd.
57. $7.854
58. 214 sq. ft.

Page 113

59. $2169.62
60. 2632.0896 gal.
61. 4.898+ ft.
62. 34,560 cu. ft.
63. 84.8232 cu. in.
64. 795.218 lb.
65. 183,218.112 gal.
66. $293,626.66⅔
67. 15¾ sq. ft.; 189 cu. ft.
68. $97
69. $32

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Page 114

1. 101.5 mi.	7. 297.57 hr.	13. .0025A.	19. 279 gal.
2. $562.24	8. 99.96 bu.	14. $.125	20. 40 T.
3. 183.52 gal.	9. 5784.75 ft.	15. 36 mi.	21. 78 rd.
4. 10.0775 lb.	10. 836 sheep	16. 20.1 bu.	22. 12.5 pt.
5. .43992 mi.	11. 7995 A.	17. $4.50	23. 11,200 da.
6. 794.88 cu. in.	12. $42,650	18. 640 lb.	24. $33\frac{1}{3}$ hr.

Page 115

25. 864.32	29. 4.336	33. 31248	37. 5.15565
26. 204.6375	30. 42.36	34. 18.72	38. 4.2315
27. 2399.92	31. .8006	35. .3168	39. .14
28. 4,460	32. .504	36. 94.5	40. 9.6

1. 585,039 A. 2. 308.5 mi. 3. 7,500 bu. 4. 5995

Page 116

5. $722.22\frac{2}{9}$ cu. yd.
6. 172.5
7. 42 gal.
8. 400.50 for rent ; $578.50 for food ; $186.90 for fuel
9. $163.125
10. $20,742.48
11. $1623.60
12. $68
13. $5,975.50

Page 117

14. 1083 elm ; 1615 oak ; 1102 maple
15. (a) $15,429.60 ; (b) $20,572.80 ; (c) $6857.60
16. 1641.6 bu. corn
17. $3,494.48 difference ; $3,494.48 greater loss.
18. $38.037+
19. $237.1638

Page 118

20. $7.125 21. 888

1. 14%	5. 20%	9. $12\frac{1}{2}$%	13. 25%	17. 4%
2. 8%	6. 5%	10. 14%	14. 50%	18. 12%
3. $8\frac{1}{3}$%	7. 3%	11. 16%	15. $33\frac{1}{3}$%	
4. 7%	8. 8%	12. 18%	16. $66\frac{2}{3}$%	

Page 119

19. $33\frac{1}{3}$%	20. $14\frac{2}{7}$%	21. 24%	22. $9\frac{1}{2}$%	23. $2\frac{1}{2}$%

1. $13\frac{1}{3}$%	4. 95%	6. 15%	8. $47\frac{21}{57}$%
2. 83%	5. $742 ; $43\frac{3}{4}$%	7. 18%	9. 56%
3. $43\frac{3}{4}$%			

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Page 120

10. $3\frac{1}{3}\%$
11. 25%
12. $43\frac{1}{3}\%$
13. 30%
14. $80\frac{8}{15}\%$
15. 20%
16. $\frac{1}{4}\%$
17. $12\frac{4}{7}\%$
18. 75%

Page 121

1. 200
2. 1200
3. 176
4. 600
5. 567
6. 1500
7. 1680
8. 162
9. 216
10. 150
11. 216
12. 1488
13. 88
14. 600
15. 388
16. 136
17. 160
18. 420
19. 64
20. 270
21. 134
22. 400
23. 770
24. 172.5
25. 1,350,000
26. 3800
27. 5600

Page 122

1. $1880.04
2. 763 bu.
3. 800 cu. yd.
4. $3600
5. 585 trees
6. $148.75
7. $459
8. $818\frac{3}{4}$ mi
9. $1450.40
10. $549

Page 123

11. 930 gal.
12. $1326
13. 526 mi.
14. $61.875
15. 490 mi.
16. 75.4 A.
17. 385 mi.
18. 696 girls
19. 168,550 people
20. 4320 cu. ft.
21. $2460

Page 124

1. 250
2. 300
3. 400
4. 545
5. 650
6. 786
7. 975
8. 1004
9. 1250
10. 1634
11. 2756
12. 4305
13. 5043
14. 68,910
15. 781,112
16. 4400
17. 7062.5
18. 5840

Page 125

19. 6014
20. 1240

1. $625
2. $75
3. $390
4. $32,000
5. 3375 bu.
6. 10,547.25 mi.
7. $1240
8. 2080

Page 126

9. 1328
11. 2215 mi.
12. 658 bu.

1. 3000
2. 3000
3. 800
4. 200
5. 1200
6. 72
7. 8400
8. 2400
9. 450
10. 3456
11. 3256

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Page 127

12. 4295 14. 2268 16. 1650 18. 10,395 20. 3428
13. 1600 15. 2000 17. 1500 19. 2896

1. $1875 2. 3332 mi. 3. 3420 4. 900 bu.

Page 128

5. $5872 7. 268 mi. 9. $1715 11. 1500
6. $236 8. $420 10. 270,600 12. 2250

Page 129

1. $1.50 4. $11,846.80 7. $5133 10. $3458
2. $476.625 5. $289.12 8. $2.62½ 11. $4755.40
3. $46.12½; $322.87½ 6. Neither 9. $.76 4/11

Page 130

12. $1260

1. 60% 3. 10% 5. 20% 7. $15.75; 56¼% 9. 6¼%
2. 16⅔% 4. 33⅓% 6. $15.79; 16⅔% 8. 27.8+% 10. 16⅔%

Page 131

1. $6336 4. $.86 7. $.06¼ 10. Lost $5
2. 15% 5. $25 8. $.75 11. $20
3. $23 6. $8625 9. $450; $471

Page 132

12. $1.80 15. 29 7/17% 18. $30,000 20. 16⅔%
13. A's, $100; B's, $140 16. $1000 19. $3000 21. $4800
14. 8% 17. $1.60

Page 133

1. $216.56 3. $1103.26 5. $41.17 7. $42,761.25
2. $41.92 4. $64.39 6. $1975.90 8. $140

Page 134

9. $12,193.44 10. $116.10 11. $626.73

1. 3¾% 2. 3% 3. 3% 4. 2% 5. 5% 6. 1¼%

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Page 135

7. $3\frac{1}{2}\%$ 8. $1\frac{1}{4}\%$ 9. 5% 10. $2\frac{1}{2}\%$ 11. $1\frac{1}{2}\%$ 12. $2\frac{1}{2}\%$

1. \$1060 2. \$2005.50 3. \$150.75 4. \$408 5. \$2205.90

Page 136

6. \$87.50 7. \$1680; \$92.40 8. \$44.80

1. \$885.60 3. \$639.36 4. \$70 5. \$590.52 6. \$463.125
2. \$900.20

Page 137

7. \$837
8. \$527.79
9. \$540.94
10. \$59.43
11. \$319.046+
12. \$431.76
13. 28 %
14. $34\frac{2}{3}\%$
16. $23\frac{89}{100}\%$

Page 138

1. 10 %
2. 5 %
3. 25 %
4. \$150; 30 %
5. 8 %
6. \$828; $17\frac{1}{2}\%$
7. \$180; 28 %
8. \$312; 22 %

Page 139

1. \$1750
2. \$1350
3. \$650
4. \$880
5. \$375
6. \$1800
7. \$1000
8. \$175
9. \$1200
10. \$750

Page 140

1. \$50
2. \$22.50
3. \$227.50
4. \$225
5. \$135
6. \$396
7. \$318.75
8. \$318.75
9. \$343.75
10. \$6
11. \$10
12. \$45.63
13. \$93.60
14. \$37.50

1. \$30.63 2. \$52.50 3. \$9 4. \$78.75

Page 141

1. 2%
2. $2\frac{1}{2}\%$
3. 2%
4. $1\frac{1}{4}\%$
5. 2%
6. $\frac{2}{5}\%$
7. $1\frac{1}{2}\%$
8. $1\frac{3}{4}\%$
9. $1\frac{1}{2}\%$
10. $1\frac{1}{4}\%$

1. $\frac{3}{4}\%$; \$6400 2. $\frac{1}{8}\%$ 3. $1\frac{3}{4}\%$ 4. $1\frac{1}{2}\%$

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Page 142

1. $45,000
2. $13,333.33+
3. $26,666.66+
4. $14,400
5. $76,000
6. $3200
7. $1650
8. $8530
9. $15,515.20
10. $20,000

1. $4824 2. $80,000 3. $8000 4. $5125 5. $5200

Page 143

1. $662.50
2. $7700
3. $1800
4. $187.50
5. $428.75
6. $18.90
7. $2340
8. $3935
9. $283.50; $3000

Page 144

1. $50 3. $46.67 5. $41.38 7. $1400 9. $238.125
2. $36 4. $325 6. $12,443.15 8. $278

Page 145

1. 3½%
2. 2%
3. 20 mills
4. $5529.25
5. 28 mills; $122
6. (a) .4947+%; (b) $32.16
7. 5 mills
8. 1.2%; $183.75
9. 1.7%; $17

Page 146

1. $1705
2. $10,400
3. $20,000
4. $17,500
5. $4600
6. $165,000
7. $240,625
8. $288,750
9. $10,000,000
10. $568,325
11. $16,845

Page 147

1. $877.50
2. $2,413.25
3. $822.67
4. $10,232.75
5. $7706.25
6. $56,253
7. $40,000
8. $9850
9. $9450
10. $2490
11. $15,000
12. $2,192.97

Page 148

1. 15 % 2. 12 % 3. 45 % 4. 38 % 5. 40 %
1. $75,000 2. $100,000 3. $17,658 4. $24,525 5. $4,600

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Page 149

1. $321.75; $1296.75
2. $2075.52
3. $2053.50
4. $2127.10
5. $1798.50
6. $3001.11
7. $2049.30
8. $3160.96
9. $2108
10. $1373.50
11. $273.02

Page 150

12. $984.96
13. $229.59
14. $919.80
15. $377.49
16. $391.26
17. $1345.49
18. $525.67
19. $11.10
20. $10.79

1. $520
2. $66.41
3. $640

Page 151

4. $109.74
5. $1290
6. $480
7. $1425
8. $8.91
9. $325
10. $380
11. $28.35
12. $475

1. 3 yr., 9 mo., 27 da.
2. Aug. 9, 1911

Page 152

3. Jan. 26, 1910
4. 1 yr., 8 mo., 3 da.
5. 2 yr., 9 mo., 21 da.
6. 2 yr., 7mo., 6 da.
7. 2 yr., 7 mo., 15 da.
8. Aug. 23, 1908
9. 1 yr., 6 mo., 23 da.

1. 5½ % 2. 6 % 3. 6⅓ % 4. 7½ % 5. 8 % 6. 5 %

Page 153

7. 4½ %
8. 7 %
9. 6 %

1. $898.88
2. $619.33
3. $1208.70
4. $181.23
5. $950.52
6. $97.03

Page 154

7. $7712.85
8. (a) $107.38; (b) $90.60; (c) $126.81; (d) $78.84; (e) $97.85

1. $171.86
2. $613.80

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Page 155

3. $804	5. $227.63	7. $2176.67	9. $828
4. $100.27	6. $1595	8. $963.70	10. $9739

Page 156

1. Mar. 1; 59 da.	5. Jan. 18; 78 da.	9. Jan. 10; 254 da.
2. Nov. 1; 170 da.	6. Mar. 7; 20 da.	10. July 16; 76 da.
3. Dec. 15; 75 da.	7. Aug. 3; 124 da.	
4. May 4; 33 da.	8. Mar. 7; 6 da.	

1. $34.65

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2. $6.05	4. $562.30	6. $682.07	8. $825.99
3. $835.97	5. $472.80	7. $554.40	

Page 158

9. $893.10	12. $985	15. $12.35
10. $347.72	13. $424.83	16. $14.95
11. $503.27	14. $1649.63	17. $574.27

Page 159

1. Nov. 1; 82 da.; $12.30; $887.70
2. Apr. 1: 90 da.; $12.50; $987.50
3. June 14; 44 da.; $41.07; $4758.93
4. July 1; 30 da.; $1.25; $248.75
5. July 1; 167 da. $8.35; $291.65

1. $460	3. $252.53	5. $1249.36	7. $839.57
2. $365.48	4. $1760.20	6. $4.80	

Page 160

8. $2160.09	9. $3148.94	10. $980
1. $150	3. $3865	5. $1260
2. $16,962	4. $4257.50	6. $993

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Page 161

1. 40 shares 2. 100 shares 3. 125 shares 4. 140 shares

1. $23,327.50 2. $13,690 3. $48,000 4. $23,647.50

1. $2,205

Page 162

2. $216 3. $60 4. Real estate $100 better 5. $560 6. $80

1. 112\frac{3}{8}$ 2. 74\frac{5}{8}$ 3. 114\frac{1}{4}$ 4. 99\frac{1}{8}$ 5. 97\frac{1}{2}$

Page 163

1. 66\frac{3}{4}$ 2. 166\frac{3}{4}$ 3. 68\frac{3}{4}$ 4. $125

1. 22$\frac{2}{3}$% 2. 25% 3. 16$\frac{2}{3}$%

1. 2$\frac{1}{2}$% 2. 2$\frac{1}{2}$%

Page 164

1. $18,875,000 2. $5,950,000 3. $250,000 4. $50,000

1. 4$\frac{1}{17}$% 2. $56,250 cost; 3$\frac{5}{9}$% 3. 5% 4. 8% 5. 3$\frac{11}{13}$%

Page 165

1. $344; $430
2. 1st $2400; 2nd $2100
3. Daughter, $9,000;
   Son, $15,000
4. 675 apple, 1125 peach
5. 390 boys; 510 girls
6. oats 96 bu.; barley 64 bu.
7. £47
8. 1st $15; 2nd $20
9. Oxygen 288 cu. ft.:
   Nitrogen 1152 cu. ft.
10. 1st $650; 2nd $800

Page 166

1. $3.125
2. 9 da.
3. $760
4. 39 da.
5. 50 men
6. 183 ft. 4 in.
7. 6$\frac{7}{8}$ in.
8. 240 mi.
9. 30 da.
10. 10800 bu.
11. $257.60
12. $4

Page 167

13. $1296
14. 4 da.
15. $945
16. 16 da.
17. 18 da.
18. 2$\frac{1}{2}$ da.
19. 18 men
20. $18.75
21. $264.60
22. 450 bu.

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Page 168

1. 32
2. 49
3. 64
4. 85
5. 97
6. 200
7. 475
8. 892
9. 1600
10. 9004
11. .19
12. .24
13. .35
14. .81
15. 1.21
16. 14.14
17. 23.45
18. 90.55
19. 680.84
20. 936.17
21. $\frac{24}{25}$
22. $\frac{21}{25}$
23. $\frac{17}{25}$
24. $\frac{42}{75}$
25. $\frac{56}{109}$
26. $\frac{63}{65}$
27. $\frac{18}{99}$
28. $\frac{40}{65}$
29. $\frac{6.57}{7.45}$
30. $\frac{8.93}{9.87}$

Page 169

31. 23 in.
32. 24 in.
33. 26 in.
34. 31 in.
35. 3.5 in.
36. 6.7 in.
37. 80 in.
38. 8.5 in.
39. 2.45 in.
40. .657

1. 100 ft.
2. 96 trees
3. 51 ft.
4. 40 rd.
5. 21.908 rd.
6. 275.5 yd.
7. 42 rd.
8. 10.61 yd.

Page 170

9. 21.21 rd.
10. 39.2 ft.
11. 28.42+ ft.
12. 12.806 ft.
13. 17 ft.
14. 28 yd. and 14 yd.
15. 60 rd.
16. 248 rd.
17. $140.40
18. $322.50
19. 80 rd. long; 40 rd. wide
20. 5 A

Page 171

21. 1131.36 rd.
22. 14.14 ft.
23. $\frac{15}{88}$ mi.
24. 34.64 in.

1. 14,364 gal.
2. 1362½ mi.
3. 272 qt.
4. 307 mi., 299 rd., 3 yd., 1 ft., 6 in.
5. 2 cu. yd., 23 cu. ft., 524 cu. in.
6. 36
7. 162,502 in.
8. 1 mi., 123 rd., 4 yd., 2 ft., 7 in.

Page 172

9. 814⅓ revolutions
10. 960 A.
11. 127.32 rd.
12. 2972
13. $3552.06
14. $32,500,000
15. $1620
16. $147.96
17. 45 ft.
18. 18.8 A.
19. 6 M.

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Page 173

20. $30.75
21. $2.93
22. $.62
23. $741.88
24. $61\frac{1}{8}$ mi.
25. $7\frac{5}{8}$ mi.
26. $833.14
27. 200 doz.
28. $87\frac{57}{89}$ hr.

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29. $498.17
30. $18.09
31. $36\frac{111}{160}$ mi.
32. $178
33. $115\frac{7}{8}$ A.
34. $17\frac{68}{171}$ da.
35. $.07\frac{3}{4}$
36. $48

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37. $ 5.03
38. 73,846.47+ rd.
39. 8%
40. $113\frac{1}{4}$%
41. $5\frac{1}{2}$% loan; $175
42. 12 da.
43. $640
44. $30.63

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45. $4.50
46. $57.76
47. $\frac{3}{7}$
48. 21 lots
49. 2 hr. 58 min.
50. $1961.85
51. $450
52. 4 A.
53. $3,997.50
54. $41.39

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55. $800 gain
56. 32.8 bbl.
57. $27.25
58. $18.75
59. $23.50
60. $109.92
61. $73.75
62. $252.84

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63. 28.2744 cu. ft.
64. $980
65. 1800 bbl.
66. $45.40
67. $106\frac{3}{8}$%
68. $2400
69. $74,473.50
70. $3\frac{1}{3}$ da.
71. A, $48; B, $60

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72. $1,645
73. $\frac{9}{25}$
74. $16.88
75. 153.9384 sq. yd.
76. $14,000
77. $14.08
78. $23
79. 1 cu. yd. 13 cu. ft. 755 cu. in.; 3 bu. 2 pk. 4 qt. 1 pt.
80. 27.64+ft.
81. $788.17

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82. 15 %
83. 64 rd.; 80 rd.
84. 165
85. $33\frac{1}{3}$ %
86. 251,328 ft.
87. $347.72
88. 203,553
89. No change
90. 40 rd.; $330
91. 25.1328 ft.

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92. A $120; B $80; C $50
93. 24.97 sq. ft.
94. 13.09 cu. in.
95. 24 sq. yd., 2 sq. ft., 24 sq. in.
96. $38\frac{1}{4}$ A.
97. 18 A.
98. $18\frac{3}{15}$ gal.
99. 706.86 sq. ft.
100. $22\frac{3}{5}$
101. $600

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